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**ABSTRACT**

The experimental 1973-74 edition of Unit IV consists of 28 life science curriculum activities for 13- to 16-year-old educable mentally handicapped children. The role of the teacher in continuing field trials is noted and environmental themes and elements, inquiry skills, problem solving skills, and applicational behaviors and attitudes are stressed. Directions for using the student records-of-progress and tallysheets are provided for the teachers. The three cores of activities are preceded by suggestions of general aims (e.g., student development of a success syndrome and development of some control over the environment), specific goals, objectives, and a planning guide listing materials needed for each activity. Titles for core A, which contains seven activities on energy and material transfer, include: (1) Making Compost; (2) The Food Chain Game Revisited; and (3) Food Webs in My Community. Titles of some of the activities in Core B--Decomposers in My Environment--are: (1) Starting to Round Up the Food Chain; (2) Talking Rot; (3) Planting in Compost; and (4) A Real Gas. Among the nine activity titles for Core C--Garbage and My Environment--are: (1) Classroom Trash; (2) Every Litter Bit Helps; and (3) The Recycling Pay Off. Activities are organized in terms of materials, teaching strategies, and anticipated student behaviors. An evaluation/feedback form accompanies each activity. (MC/SM)

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# LIFE SCIENCE

A SPECIAL EDUCATION

EXPERIMENTAL EDITION

UNIT IV

## Transfer And Cy Materials In My En



Biological Sciences Curriculum Study

# A SPECIAL EDUCATION PROGRAM

## EXPERIMENTAL EDITION 1973-74

## UNIT IV

# Transfer And Cycling Of Materials In My Environment

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Biological Sciences  
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[illegible]



## Me and my Environment

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## Me and my Environment

### INTRODUCTION

The project to develop a life science curriculum for the educable mentally handicapped (EMH) was originally funded in the summer of 1969 by the Division of Research, Bureau of Education for the Handicapped, United States Office of Education. The project is charged with writing, field testing, evaluating, and disseminating materials dealing with topics in life sciences for the EMH population in our schools.

ME NOW, the BSCS model life science program for educable mentally handicapped youngsters in the 11- through 13-year

age-group, has been  
Company of Northbro

On the basis of  
of meeting further  
for the Handicapped  
grant to develop mod  
Recognition by the e  
on matters of enviro  
the project that a p  
on environmental stu  
which is entitled ME

### DEVELOPMENT

Summer, 1971 - Initial writing conference

Academic year, 1971-72 - Initial testing

Summer, 1972 - Revision

Academic year, 1972-73 - Large-scale field test

Summer, 1973 - Revision

Academic year, 1973-74 - Conclusion of field test

Fall, 1973 - Unit I,

Spring, 1974 - Uni

Fall, 1974 - Uni

Spring, 1975 -  
Environment

Fall, 1975 -

Spring, 19

## INTRODUCTION



age-group, has been released and is available from Hubbard Scientific Company of Northbrook, Illinois.

On the basis of the success of the ME NOW program, and in anticipation of meeting further student and instructor needs, the Bureau of Education for the Handicapped has provided the BSCS with a three-year continuation grant to develop model materials for 13- to 16-year old EMH students. Recognition by the educational community of the need for special emphasis on matters of environmental concern led the BSCS staff to decide early in the project that a portion of the materials for EMH students should focus on environmental studies. The time line for developing this new curriculum, which is entitled ME AND MY ENVIRONMENT, is shown below.

### COMMERCIAL RELEASE

Fall, 1973 - Unit I, Exploring My Environment

Spring, 1974 - Unit II, Me As An Environment

Fall, 1974 - Unit III, Energy Relationships In My Environment

Spring, 1975 - Unit IV, Transfer And Cycling Of Materials In My Environment

Fall, 1975 - Unit V, Air And Water In My Environment

Spring, 1976 - Unit VI, Populations And Societies



## Me and my Environment

### THE ROLE OF THE TEACHER IN THIS EXPERIMENTAL EDITION

This curriculum has been written for and by teachers; it was tested and modified by teachers, enthusiastic teachers for this development, testing, and modification. Twelve of these teachers. Thirty-nine more were selected as experimental teachers to provide the best possible field test providing feedback for the revision depended heavily upon the resourcefulness of these teachers.

In the continuing field trials, teachers have several responsibilities, including:

1. Implementing the strategies and activities exactly as they are written. Only when all teachers' analysis of results be depended upon to reveal strengths and weaknesses of the program.
2. Developing a feel for the inquiry strategy, the flow of activities, and the ultimate student around. Through their understanding of this rationale, the test teachers can make an inventory of some activities, the modification of others, and the invention of new ones that will enable.
3. Providing timely, accurate, and detailed feedback that specifies strengths and weaknesses, for each activity.

The following outline will provide you with an overview of the six major components of the program.

#### 1. UNITS IN ME AND MY ENVIRONMENT

UNIT I. EXPLORING MY ENVIRONMENT	UNIT II. ME AS AN ENVIRONMENT	UNIT III. ENERGY RELATIONSHIPS IN MY ENVIRONMENT	UNIT IV. TRANSFER CYCLING MATERIAL MY ENVIRONMENT
Investigating the Visible Environment	Microbes and Me	Introduction to Energy	Energy and Material Transfer
Landmarks in the Visible Environment	Disease in People Environments	Energy in Food	Decomposers in My Environment
Sensing the Invisible Environment	Environmental Choices and Chances (Drugs, Alcohol, Smoking)	Energy Flow through Food Chains and Webs	Garbage and My Environment
Looking at the Invisible Environment		Food Making in Plants	



BSCS

ON

ts; it was tested and modified by teachers. The BSCS has found highly skilled, flexible, and , and modification. Twelve of these teachers served as writers to help create the materials. chers to provide the best possible field test of the curriculum. The success of these tests in y upon the resourcefulness of these teachers.

al responsibilities, including:

tly as they are written. Only when all teachers use the curriculum as prescribed can the strengths and weaknesses of the program.

flow of activities, and the ultimate student behaviors that the curriculum is organized tionale, the test teachers can make an invaluable contribution by suggesting the extension of d the invention of new ones that will enable their students to achieve the objectives.

ck that specifies strengths and weaknesses, modifications, alternatives, and student responses

view of the six major components of the program:

UNIT III. ENERGY RELATIONSHIPS IN MY ENVIRONMENT	UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT	UNIT V. AIR AND WATER IN MY ENVIRONMENT	UNIT VI. POPULATIONS AND SOCIETIES
Introduction to Energy Energy in Food Energy Flow through Food Chains and Webs Food Making in Plants	Energy and Material Transfer Decomposers in My Environment Garbage and My Environment	Uses of Water Sources of Water Preparation of Usable Water Water Management Components of Air Changes in the Air Additives in Our Air	Interactions within a Population Population Size and Complexity Effects of Overpopulation Population Control



## Me and my Environment

### 2. ENVIRONMENTAL THEMES

Interrelationships of  
Environmental Components

Diversity and Patterns

Complementarity of  
Organisms and  
Environment

Flow of Energy

Cyclic Nature of  
Processes

Finiteness of Resources

Ecological Trade-Offs

Interrelationships of  
Environmental  
Components

Population Dynamics

### 3. ENVIRONMENTAL ELEMENTS

Space

Shelter

Living Things  
(Plants)  
(Animals)  
(Microorganisms)

Energy  
(Food Chains)

Air

Water

Man

### 4. INQUIRY SKILLS according to difficulty

Observing

Identifying

Associating

Describing

Comparing

Translating

Inferring

Applying

Predicting

Speculating

Value Judging

Comparing



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NTAL ELEMENTS

4. INQUIRY SKILLS (Ordered according to assumed difficulty level)

Observing

Identifying

Associating

Describing

Comparing

Translating

Inferring

Applying

Predicting

Speculating

Value Judging

Comparing

5. PROBLEM-SOLVING SKILLS

Experimenting

Knowing What the Problem Is and What to Do to Solve It

Recording Data

Discussion and Treatment Of Group Data

Organizing Data

Explaining, Defending, Answering Why Questions

Asking Questions

Identifying Variables

Identifying Controls

Interpreting Results

Drawing Conclusions



## Me and my Environment

### 6. APPLICATIONAL BEHAVIORS AND ATTITUDES (No order of importance is intended)

The student develops:

- vocabulary skills.
- a success syndrome.
- skills of observation.
- an attitude of inquiry.
- a sense of self-identity.
- skills in conserving water.
- skills in the hygienic care of his own body.
- skills in participating in group discussions.
- the ability to manipulate water treatment systems.
- skills in applying science experiences to everyday life.
- skills in the selection, preparation, and storage of food.
- a recognition of his own role in creating an acceptable life style.
- an ability to distinguish between healthful and unhealthful environments.
- an appreciation of the community service provided by public utility systems.
- an understanding of the interrelationships between environmental components.
- skills in functional, receptive, and expressive communication about his environment.
- skills in employing systematic problem-solving techniques to persistent problems of
- skills in recognizing environmental landmarks and utilizing these for orientation
- a recognition of his social dependence on others and his biological dependence on





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## Me and my Environment

In May 1971, a planning conference was held to prepare guidelines for the development of ME AND MY ENVIRONMENT. The conference was attended by the five members of the advisory committee, four of whom are in the field of special education and the fifth in biology; by the project writing team, consisting of five special education teachers and five biology teachers; and by the BSCS project staff. Conferees developed guidelines covering areas of environmental concern and utility for the target population of children, the characteristics of this population, and the needs of these children that might be met through environmental studies. A multidimensional model incorporating the science content, cognitive and affective behaviors, environmental themes, contextual focus, and needs of the children resulted from the planning conference. Following the conference, the BSCS project staff prepared a proposed content and objective outline for the curriculum. A thorough study was made of the existing literature covering the physical, social, and psychological needs of handicapped adults; the staff then attempted to identify which of those needs might be met by ME AND MY ENVIRONMENT.

### SOME GENERAL OBJECTIVES

The identification of needs led to a statement of general objectives. The first four were adopted as a broad benchmark against which all activities were judged.

1. To help the mentally handicapped child develop interests, skills, and positive attitudes through experiences with scientific - especially biological - concepts.
2. To provide the mentally handicapped child with challenging intellectual activity at a level commensurate with his ability to respond effectively.

3. To aid the child in heightened observation and a measure of self-awareness of his environment.
4. To contribute to the child's social maturity, vocational profile, and self-expression, and
5. To develop in the child the ability to perform tasks of everyday life in the environment, along with the tasks of everyday life.
6. To contribute to the child's understanding of the strengths and limitations of his own and others' effective strategies.

### BASIC ASSUMPTIONS UNDERLYING THE CURRICULUM

In the initial development of the curriculum, basic assumptions for the program were identified. These were tested in the development of ME NOW, and in the development of ME AND MY ENVIRONMENT.

1. Ideas must be developed in the child's own words.
2. Vocabulary, when used in a *technical* language, may be useful to the child.



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3. To aid the child in establishing functional modes of living through heightened observation, a well-developed curiosity, an increased measure of self-confidence, and a sense of responsibility to and for his environment.
4. To contribute to the development in the child of a higher level of social maturity and emotional stability that can lead to increased vocational proficiency, realistic self-concept, creative self-expression, and more effective assimilation into the community.
5. To develop in the child a knowledge of himself in relation to his environment, along with a tendency to apply this knowledge to the tasks of everyday living.
6. To contribute to increased knowledge about the learning characteristics and limitations of the educable mentally handicapped pupil, and about effective strategies for instruction.

#### BASIC ASSUMPTIONS UNDERLYING THE DESIGN FOR THE CURRICULUM MATERIALS

In the initial discussions with the special education community, some basic assumptions for the development of the life science materials were identified. These were revised somewhat, based on the development and testing of ME NOW, to form the underlying assumptions for the development of ME AND MY ENVIRONMENT.

1. Ideas must be developed with a minimum of reading on the part of the student.
2. Vocabulary, where possible, should involve *functional* rather than *technical* language, although technical names are taught when these may be useful to the student.

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## Me and my Environment

3. Entry points should be concerned with concrete, tangible "things," rather than with abstract, intangible ideas or concepts.
4. The classroom environment and the materials should not be cluttered with distractors; however, a variety of perceptual modes and instructional media should be used (e.g., sight, touch, smell, etc.).
5. Activities should be developed in small, discrete units that build on or reinforce a concept or skill.
6. Learning, for the EMH student, requires slower pacing, greater redundancy, and time for participation by each student. The instructional materials should be student-doing rather than student-watching.
7. An activity must involve the student in ways of applying the desired behavior; transfer cannot be assumed.
8. EMH children need, and can respond effectively to, an activity-oriented instructional approach.
9. The curriculum should be designed to provide students with an experience in science as inquiry, through the exploration of their environment.
10. Most teachers of the Educable Mentally Handicapped will need specific directions in using inquiry strategies for teaching science concepts.
11. The teachers of the Educable Mentally Handicapped, for the most part, are not science-oriented; therefore, the materials should be specific with regard to science techniques.
12. The materials and methods must permit or provide attention to individual differences and to specific learning characteristics of the population.

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### MAJOR AIMS FOR ME

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13. To achieve the objectives, designers of the materials should attempt to create a balance between detail and motivation; that is, the amount of minute and abstract detail that can be learned is probably a function of the interest and motivation that can be established to deal with it.

MAJOR AIMS FOR ME AND MY ENVIRONMENT, A JUNIOR HIGH EMH SCIENCE CURRICULUM

The curriculum includes instruction related to the personal well-being, self-worth, confidence, and successful coping of each person to meet persistent daily life problems. The major aims are:

1. Development in each child of a sense of identity as a person who has some degree of control over and can act on his environment. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. Development in each child of a success syndrome. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility - almost obligation - to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. As a group, the students should help each individual fit what he has done into a pattern of accomplishment.

The curriculum is intended to be intellectually stimulating, and exploratory for each student, and to induce him to become actively involved. It should encourage the following outcome:

3. Development in each child of an interest that could become a hobby or avocation over a lifetime (through an exposure to an array of experiences in science). It is hoped that many children will find some



## Me and my Environment

area - perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country - that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.

The curriculum is organized around eight ecological themes. There are some specific content objectives related to these. The ultimate objectives are:

4. Development in each child of a sense of relationship and empathy with other living things. It is hoped this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. Development in each child of an understanding of environmental conditions that will lead to a sense of responsibility for the environment and actions that protect or improve it.

These are the five overriding aims that should serve as reference points for teachers and guide much of what they plan to do in the classroom. One of the older junior high students in a first-year test class expressed his feelings about the class and himself in this way: "I just feel that if we want these kids to improve, and that's the whole idea of it, you have to bring these kids a certain amount of happiness. You have got to make them feel that they are really wanted. If they are wanted, they will try a little harder. That sounds kind of childish, I suppose, but it works...Another thing...always inspire: 'Come on, put your best foot down - try it again.' You know, things like that. I mean, to me, just the tone of voice makes the difference to me about going out or staying in the class. I just feel that they don't want me - and they don't, (when their tone says) 'Oh, Eddie! Why did he have to come today?' "

Since the origin of MY ENVIRONMENT, eight of the major ideas and curriculum development themes. These themes are brought to be a prerequisite for society's environmental education as a unifying theme.

### 1. INTERRELATIONSHIPS

*When we try to do everything else*

Life is entirely dependent on the supplies: air, water, temperature and humidity, food. Scavengers (carnivores and fungi) obtain their food from the Green plants depend on the environment and form the basis of food chains and cycles.

Organisms interact in a variety of ways in a community or webs. Plants compete for space and growing space. Animals and shelter. Other organisms interact.

The important concepts are singular, nor do they



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## ENVIRONMENTAL THEMES

Since the original planning conference for the development of ME AND MY ENVIRONMENT, eight ecological themes have emerged which seem to encompass the major ideas and concepts (i.e., the science concept) that the curriculum development team sees as appropriate for this student population. These themes are broad generalizations, some understanding of which appears to be a prerequisite for coping with one's own environment as well as with society's environmental problems. The themes are probably best thought of as unifying threads which run throughout the curriculum.

### 1. INTERRELATIONSHIPS OF ENVIRONMENTAL COMPONENTS

*When we try to pick out anything by itself, we find it hitched to everything else in the universe. John Muir*

Life is entirely dependent upon the things that the environment supplies: air, water, food, shelter, and subtle things such as a suitable temperature and humidity. Animals depend upon other animals or plants for food. Scavengers (carrion and detritus feeders) and decomposers (bacteria and fungi) obtain their nutrition from the remains of living organisms. Green plants depend upon sunlight, air, water, and minerals from their environment and form the base upon which all organisms are interconnected by food chains and complex food webs.

Organisms interact with each other, and with the environment, in a variety of ways in addition to the eater-eaten relationships of food chains or webs. Plants compete with each other for light, water, soil nutrients, and growing space. Animals compete for available food resources, space, and shelter. Other relationships include parasite-host and pathogen-host interactions.

The important consequence of this theme is that actions are not singular, nor do they have singular impact. Man's competitive interactions



## Me and my Environment

have far-reaching, often unknown consequences. For example, clearing land for raising agricultural crops destroys the habitat for plants and animals and disrupts certain food webs, while establishing a suitable habitat for agricultural species. The resulting monocultures are often vulnerable to attack by pests because populations of natural predators have been removed. Attempts to control these competitive organisms through applications of pesticides may simply aggravate the situation by killing nontarget organisms such as predators, scavengers, and decomposers which are actually beneficial. Similarly, herbicides used in control of weeds which are competing with crops may destroy habitats for natural predators, making additional applications of insecticides necessary; these in turn may kill more nontarget beneficial organisms. Numerous studies have shown that large-scale, indiscriminate use of pesticides may, in the long run, actually decrease agricultural productivity. In addition, manufacture, transport, and application of pesticides and fertilizers contribute to air and water pollution, thereby adding to the degradation of vital resources upon which all life depends. This is but one simple example of a myriad of possibilities. If we expect students to start thinking in terms of consequences, it is imperative that they realize and appreciate that life depends upon interrelationships and that apparently simple actions may have far-reaching implications.

### 2. DIVERSITY AND PATTERNS

There is great diversity in the environment. Differences in climate and topography lead to different environments with different communities of plants and animals. The plants and animals differ as they have become adapted to do somewhat different things, or even to do similar things but in different environments. Even within one species there is diversity. But it is possible to find patterns within all this diversity. Recognizing patterns helps one get his head around a bewildering variety of things. All environments have

a pattern of function and their differences

If one looks at the diversity of sizes, shapes, and functions of organisms that are producers while that the organism

Diversity is provided by an alternative system is lost or plants, grasshoppers e.g., the grasshopper that one will also In a complex food system; links beyond and in the example resource. Thus, stability of the alone.

It is often the environment and component should

### 3. COMPLEMENTARITY

A complementarity Complementarity is to the other, where relationships have hundred or more.





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a pattern of functional or working likenesses to others that underlies even their differences. Some grasp of a whole living world is possible.

If one looks at the organisms in any habitat, he discovers a variety of sizes, shapes, and colors. Further examination will reveal groups of organisms that are related in various ways; e.g., some produce food (producers) while others feed upon these producers (consumers). We find that the organisms are all related in a pattern forming a food web.

Diversity is thought to enhance the stability of a system, for it provides alternate channels of energy or materials flow if part of the system is lost or overburdened. For example, consider a single food chain: plants, grasshoppers, frogs, snakes. If one link in the chain is lost - e.g., the grasshoppers are wiped out by insecticides - all links beyond that one will also be lost if they have no alternative sources of food. In a complex food web, however, a link may be lost without destroying the system; links beyond the missing one may turn to another channel for food - and in the example, the frogs may exploit another type of insect food resource. Thus, preserving diversity may be necessary in preserving the stability of the life-support system of the biosphere. Man cannot exist alone.

It is often said that variety is the spice of life. Diversity makes the environment less monotonous and more interesting. This aesthetic component should receive emphasis in the curriculum.

### 3. COMPLEMENTARITY OF ORGANISMS AND ENVIRONMENT

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A complement is something that completes or fills out another thing. Complementarity in this context refers to the completion each part brings to the other, when each is dependent upon the other. Some interdependent relationships have two components; others three, four, ten, or even a hundred or more. A few examples should clarify the meaning of the theme.



## Me and my Environment

Organisms use material things from the environment and, in turn, recycle things back to the environment, where they may be used by other organisms. Thus, the presence of organisms modifies the environment in various ways, some of which make the environment more suitable for other organisms. Plants use carbon dioxide and release more oxygen than they use. Consumer organisms (animals, decomposers) use oxygen and release carbon dioxide. Both the producers and consumers are dependent upon the environment for these resources, and the balance of these materials in the environment is likewise dependent upon both groups of organisms.

Without scavengers and decomposers there would be a prodigious accumulation of the remains of once-living organisms cluttering up the environment. Probably all of the available carbon, oxygen, and other essential elements would be tied up in these dead remains. Life would have come to a screeching halt a long time ago!

The presence of plants improves the water-holding capacity of a watershed and helps prevent erosion of the soil by wind and water. Plants reduce the rate of evaporation of soil water but at the same time release it to the atmosphere. Thus, plants play a vital role in the water cycle and influence local climates through the regulated flow.

Plant succession is a classic example of complementarity. An abandoned field, new roadside, or similar disturbed area is quickly invaded by hardy pioneer plants which we usually think of as weeds. As these grow, die, and decay, they modify the immediate environment and are replaced by plants which are better adapted to the new conditions. These, in turn, cause further modifications and are replaced by other populations; finally a relatively stable community exists that is able to replace itself and that is in dynamic equilibrium with the environment. Such communities are usually referred to as climax communities.

#### 4. FLOW OF ENERGY

*The biotic stream flows rapidly or slowly, depending on the volume. Ecologists call this flow of energy a food chain...*

Energy is required for life. Indeed, to maintain a continuous flow which sustains the sun, its photosynthetic producer organisms along various paths, its eventual loss as it is converted or transformed is lost from the system. In simple terms, is the energy used to fix photosynthetic organisms intercepted. In turn, the energy is used by the plants for survival and growth of materials. Thus, the energy is available to the organisms which use energy in their survival. Of the energy which is used by their predators. As any step in a food chain, the energy is captured on agricultural land within a year if planted in beef cattle!

Society's use of energy is captured and stored as a source of energy is



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#### 4. FLOW OF ENERGY

*The biotic stream is capable of flowing in long or short circuits, rapidly or slowly, uniformly or in spurts, in declining or ascending volume. Ecology calls this sequence of stages in the transmission of energy a food chain, but it can be more accurately envisioned as a pipe line... (which) leaks at every joint. Aldo Leopold*

Energy is required to do work; that is, to cause movement requires energy. Indeed, to do anything requires energy. Life depends upon this continuous flow which is initiated by a constant input of energy from the sun, its photosynthetic transformation from light to chemical energy by the producer organisms (green plants), its passage from organism to organism along various food chains (in their more complex food webs), and its eventual loss as radiant heat to outer space. Each time that energy is converted or transformed, at each step along the way, some of it is lost from the system and is no longer available to do useful work. This, in simple terms, is the second law of thermodynamics. Green plants are able to fix photosynthetically only a portion of the sun's energy that they intercept. In turn, some of the energy which they trap and store is used by the plants for such things as growth, reproduction, and the movement of materials. Thus, only a portion of that original stored energy is available to the organisms which eat the plants. These organisms likewise use energy in their various life processes so that only a small portion of the energy which they received from eating plants is available to their predators. As a consequence, only about one-tenth of the energy at any step in a food chain is available to the next level. An acre of agricultural land will provide enough food energy for about 1.5 persons for a year if planted in wheat, but will feed only 0.1 person if used to raise beef cattle!

Society's use of fossil fuels is simply a utilization of energy captured and stored over millions of years by green plants. As such, this source of energy is in finite supply and is a nonrenewable resource.



## Me and my Environment

Electricity generated by fossil fuel-burning plants can similarly be traced to the sun. Hydroelectric plants offer a limited alternative source of electricity. This source is also finite because of the limited number of adequate sites. The planned use of nuclear fusion reactors (which are simply a duplication on earth of the natural processes taking place on the sun to release energy) offers an alternative source of energy (again sought as electrical energy) for society; this source, however, as with all others, is governed by the laws of thermodynamics. The energy, once released, flows through the system and is eventually lost to space as heat. Hence this source is also finite, but it is a very large source. The exploitation of nuclear energy is fraught with unanswered questions and problems. How can we safely contain and shield the radioactive processes of fusion? How can we safely dispose of the radioactive wastes from the "temporary" fission reactors being used until fusion reactors, which produce little waste, are perfected? Can the earth dissipate the huge amounts of waste heat generated? What effects will this heat have on climates, ecosystems, and organisms?

It should be emphasized that nuclear energy offers little hope, at present, of replacing the sun as a life-supporting source of energy. In the foreseeable future, man's only source of food energy will be the sun, through photosynthesis of green plants.

### 5. CYCLIC NATURE OF PROCESSES

*All the rivers run into the sea, yet the sea is not full.* King Solomon

In contrast to energy, materials (matter) are continuously recycled from living to nonliving systems and back to living systems again. Materials necessary for life are in finite supply; and if they were not constantly cycled, life would simply run out of resources and cease. Some examples include the water cycle, the carbon dioxide-oxygen cycle, the nitrogen cycle, and the cycling of various essential minerals such as

calcium, potassium most vital role has been incorporated available to other

Man's presence upsets these natural nonbiodegradable the natural cycle to the exhaustion of fossil fuels in atmosphere, with water through pollution organisms which are

### 6. FINITENESS OF

Everything has a spaceship because much as life depends to be used over and to its exhaustion technological societies resources and, at resources unavailable that we will have metal resources exhausted

Through photosynthesis natural cycles are long as environment But, the amount of is finite! There that can be inter available.



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calcium, potassium, sulfur, and magnesium. Decomposer organisms play a most vital role in many of these cycles, releasing materials which have been incorporated into living organisms so that they are once again available to other organisms in the environment.

Man's present exploitation of consumable resources, in most cases, upsets these natural cycles. The manufacture and ultimate discarding of nonbiodegradable products removes important elements and compounds from the natural cyclic processes of the ecosphere and could ultimately lead to the exhaustion of such resources for the life-support system. Burning of fossil fuels is changing the natural balance of carbon dioxide in the atmosphere, with the consequences largely unknown. Degradation of air and water through pollution and the application of pesticides destroys organisms which are vital to cyclic processes.

## 6. FINITENESS OF RESOURCES

Everything has to come from somewhere. The earth has been likened to a spaceship because of its finite supply of all material resources. Inasmuch as life depends upon a continued supply of resources, things have to be used over and over. Continued exploitation of any resource will lead to its exhaustion unless that resource is recycled. The demands of today's technological societies are placing tremendous burdens on the earth's resources and, at the same time, the wastes generated are making other resources unavailable or unfit for supporting life. Projections indicate that we will have depleted our supply of fossil fuels and several important metal resources early in the next century.

Through photosynthesis, food is a renewable resource so long as the natural cycles are able to resupply the raw materials necessary, and so long as environmental conditions necessary for plant life are maintained. But, the amount of food that can be produced on the earth at any one time is finite! There is only so much area available, only so much sunlight that can be intercepted, and only so much of the required raw materials available.



## Me and my Environment

The consequence of this theme is that an indefinite continuation of growth and an increasing use of resources is impossible when the supply of all resources is finite. This is true of population, food consumption, resource utilization, technology, gross national product, or any other parameter which one chooses to measure. And all noteworthy predictions indicate that we are very rapidly reaching the limits of growth. Most of us will probably experience the dire consequences!

### 7. POPULATION DYNAMICS

A population refers to a collection of individuals of the same species occupying a given space at a given time. The size of living populations is determined by four factors: rate of birth, rate of death, rate of immigration, and rate of emigration. Populations tend to grow geometrically (e.g., 2, 4, 8, 16, 32,...) to the limit (carrying capacity) of their environment as determined by the available food, space, predation, and disease. They then either level off and exist in some fluctuating equilibrium with other populations, or they crash back to some low level. A common misconception is that all biological populations tend to follow the first pattern: growth which is described by an S-shaped curve up to the carrying capacity, followed by a fluctuating equilibrium. There are, however, many biological populations which dramatically overshoot the carrying capacity of their environment and, as resources are rapidly depleted crash back to a low population level. A blowfly population is a good example of the latter. Upon arrival at a carcass, the population increases rapidly, completely overshooting the carrying capacity or the environment's capacity to sustain the population for any appreciable length of time. As the food resource is quickly depleted, the population crashes back to the low level of a few adult flies who are searching out a new carcass to feed upon.

The strategy is simple - exploit the environment for all it's worth while it is here and hope that a few of the many adults produced in the process will survive long enough to make it to the next carcass. There

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Perhaps the gre is to help this popu population growth an achieve the desired understanding of the This is one area whe influence, and can c pressing problem!

### 8. ECOLOGICAL TRAD

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is evidence that the characteristics of human population growth are similar to those described for the blowfly, and our present exploitation of the earth's resources is certainly analogous to the strategy employed by the blowfly. Such a strategy can only be disastrous for mankind. The earth is the only carcass we have.

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Since resources are finite, no population can continue to grow forever. The human population has grown geometrically over the past few centuries. Doubling time of the human population is currently less than 35 years, and the most optimistic estimates indicate that this population will exceed the carrying capacity of Earth within a century (some suggest that we have already passed the carrying capacity and many demographers and ecologists have predicted a crash in the human population prior to the year 2020). *Population control and zero population growth will be accomplished*, either by self-imposed means or by natural means. If the latter, it will occur through starvation, disease, war, or lower fecundity - or a combination of these. There is no plausible alternative!

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Perhaps the greatest service that this curriculum could hope to perform is to help this population of youngsters understand the implications of population growth and the necessity for limiting family size. But, to achieve the desired end, the curriculum must provide the students with an understanding of the ways and means by which family size may be controlled. This is one area where individuals can make decisions, can have an influence, and can contribute to the solution of what may be mankind's most pressing problem!

#### 8. ECOLOGICAL TRADE-OFFS

*Every coin has two sides.*

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carcass. There

As we have seen, all environmental components are interrelated in intricate, complex ways. No action has singular impact, and thus any course of action must be carefully weighed and alternatives considered. Any course of action involves ecological trade-offs.



## Me and my Environment

For example, consider society's use of electricity. Many of us enjoy a life style which is very closely tied to the conveniences and labor-saving devices powered by electricity. The generation of that electricity is a major factor in environmental degradation. By and large, we have made the decision to forego a certain amount of environmental quality to enjoy the leisure and convenience of electrical appliances. Projections indicate that increases in demand for electrical power will require strip mining vast areas of Wyoming and Montana, exploiting oil shale reserves of Colorado, depleting the petroleum reserves of the Alaskan north slope (with the inherent dangers to the arctic tundra), and constructing large numbers of nuclear power plants. In all of these activities, we will trade off various amounts of environmental quality.

### INQUIRY PHILOSOPHY

We do not view science as a collection of facts, but as a process by which facts are gathered, interpreted, and organized into conceptual schemes. We have included facts, and activities structured to generate facts, not for their intrinsic value but to provide the means by which concepts and generalizations are developed through an inquiry strategy.

Inquiry, simply defined, is finding out why. Inquiry may be defined as a process of questioning, or seeking information, of discovering. For EMH students, as for others, the excitement of discovery adds meaning to learning. Inquiry allows the student a natural avenue for satisfying his curiosity about his world. An inquiry strategy is one which poses a question or problem and then guides students through *inquiring kinds* of behaviors such as observing, describing, identifying, comparing, associating, inferring, applying, predicting, translating, guessing, speculating, creative thinking (divergent production), and value judging.

There are degrees of inquiry. On one end of the scale, a question is posed and the student, after analyzing the question and applying his

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### INQUIRY SKILLS

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experiences and background information, answers the question. At the other extreme, the student poses the question after being given a certain amount of background information, and then proceeds to answer the question by designing an experiment, conducting the experiment, and interpreting the results.

All degrees of inquiry have a common ingredient: the answer is not given, but is arrived at by the individual after he has analyzed information relevant to the question. The distinction is obvious - in inquiry strategies the questions are answered by the students and not the instructor.

If knowledge is acquired, at least in part, through an inquiry strategy, then the student should be able to use that strategy in acquiring further information and solving future problems as they arise. He will be more able to seek answers to other questions through his ability to acquire and interpret information.

#### INQUIRY SKILLS

1. OBSERVING is a fundamental activity of scientists. The accumulation of information which may lead to knowledge comes primarily from what we see, hear, taste, smell, or touch. A major function of this curriculum should be to offer a rich and varied environment of concrete experiences for the students. As students gain experience, accuracy in observing and recording the details of their findings should be increased. Observing should frequently include an element of divergent production by asking the students to heed all of the details, extraneous and otherwise, that they can. Opinion, interpretation, and speculation are not, of course, a part of observing.
2. IDENTIFYING involves the recognition of what something is or of certain properties that make it possible to categorize the thing. Included in identifying is the matching of a name or definition with an object, the use of a key or guide, and the recall of a label from previous experience.



## Me and my Environment

3. ASSOCIATING involves seeing what things go together - seeing relationships or recognizing common properties. Associating may be thought of as a prerequisite to classifying, or organizing data or information for some purpose. Grouping (classifying), through associating, may enhance conceptualizing.
4. DESCRIBING involves writing or relating orally all of the relevant observations about a thing so that another individual would be able to use the description to identify the object or share in an event he did not actually experience. Emphasizing description should enhance development of observational skills.
5. COMPARING involves the inspection of two or more objects (events) to note similarities and differences. It is closely related to the student's ability to distinguish between critical differences and to generalize recognizable similarities. This skill could involve the use of referents other than the things compared. It is necessary that one have an understanding of such comparatives as hotter-colder and smaller-larger, as well as a comprehension of their related values, e.g., warmer-cooler and littler-bigger.
6. TRANSLATING is the skill in which recorded observations are expressed in another symbolic form. The conversion of tabular information into a graph or of a verbal description into a drawing exemplifies this.
7. INFERRING involves going beyond the information or evidence at hand to presume a cause or an effect, or to answer a question. It requires extrapolation, may or may not be based on implication, and is closely related to two of the problem-solving skills: interpreting results and drawing conclusions.
8. APPLYING involves the use of a learned task or skill in a situation other than that in which it was originally learned. For example,

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9. GUESSING is the situation. The involved in making
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11. PREDICTING is the happen in a given the situation and
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### PROBLEM-SOLVING SKILLS

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if a child has learned to orient the top of one map with north, an application would be to orient another map with respect to north.

9. GUESSING is the generation of ideas about outcomes in a data-poor situation. The limited evidence, common sense and hunches are all involved in making the most informed judgment one can.
10. SPECULATING is the generation of ideas about the nature or outcome of a hypothetical situation. Even though the situation is unobserved, it may be reasonable to consider based on past experiences. Possibly a great deal is known about the subject - but without having observed the particular event, one must describe it from imagination.
11. PREDICTING is the skill of making informed estimates of what should happen in a given situation, based on knowledge of what enters into the situation and previous experience.
12. DIVERGENT PRODUCTION refers to the process of generating as many ideas about something as possible.
13. VALUE JUDGING involves more than simply expressing opinions or preferences. It is the comparison of things and the assignment of relative value to them, based upon some set of criteria. In this curriculum, the WHY of valuing should be sought.

#### PROBLEM-SOLVING SKILLS

Inquiry is the cognitive process of finding out WHY. The mechanism whereby this is accomplished is problem solving. The ME AND MY ENVIRONMENT science curriculum is a structured sequence of activities that enables the student, through success, to learn to seek the answers to WHY. It is hoped that the experiences provided in the curriculum will help the student face and solve the problems of everyday life, both now and later.



## Me and my Environment

There are at least three levels of mastery of problem-solving skills. The minimum level is an *awareness* of the skills. The second level is the functional ability to perform them. The highest level is the ability to design an original experiment and carry it to completion. It should be borne in mind that problem-solving behavior is a complex package involving past experience, motivation, cognitive development, and other factors. The development of problem-solving skills should be closely related to the appropriate inquiry skills, concepts, and other organizers of the curriculum.

A brief description of the intended interpretation of the problem-solving skills follows in what we consider to be a hierarchy of easiest to most difficult.

1. EXPERIMENTING, or doing something to see what happens. This skill represents the use made of the opportunity to "mess around" with a given piece of apparatus or set of materials, to pursue individual curiosity or interest, to follow a suggested line of inquiry, and in general, to find things out.

Some examples of experimenting include: investigating the properties of environmental objects (e.g., which ones will float, which ones can be burned, which are natural and which are man-made), having the opportunity to use thermometers or balances, raising a classroom pet or plants, burning things under a pinwheel, comparing objects as sensed by touch and by eyesight, and so on.

It is important to distinguish between experimenting as we have defined it and the formal aspects of experiment and experimental design. Note that the formal aspects are dealt with as a separate category and that designing experiments is thought to be the most difficult of the problem-solving skills.

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To encourage development of the beginning skill of exploration or experimenting, instructions are frequently given in the following form: "Give the students an opportunity to manipulate and experiment with the balances." "Capitalize on student interest by letting everyone observe and handle the pets," and so on.

2. KNOWING what the problem is and what to do to solve it. Defining the problem and its parts clearly is an important first step in any problem-solving situation. Yet the recognition and definition of a problem represents a difficult task for this student population, and it has been placed high in the problem-solving skill hierarchy (see Number 12). Knowing or recognizing the problem *given guidance* (or the defining events and clues for everyday problems) is not as difficult, and students are assisted through many experiences in recognizing that a problem exists, in thinking about that problem, and in understanding how answers to it might be obtained. This skill must be emphasized (that is, understanding the problem) for the logical development of those skills which follow. The student must know the question under investigation and clearly comprehend the methods to be used in attempting to answer that question. The materials should emphasize (for both teachers and students) that science is a process of finding answers to questions. There is a subtle difference between stating a question to suggest its answer (e.g., "To see if it is warmer in the sun or in the shade") and stating it as a problem to investigate (e.g., "To see if there are differences in the temperature of different parts of the environment, and to try to find out why if there are").
3. RECORDING DATA Questions of science are answerable through observation and collection of data pertinent to the question. Recording of observations is a necessary skill to enable the investigator to recall the observations and discuss and interpret them in view



## Me and my Environment

of the questions. Included here is the collection and transcription of information called for by the question: making sketches, notes, taking pictures, recording sounds, and recording measurements.

4. **DISCUSSION AND TREATMENT OF GROUP DATA - COMPARING RESULTS** A look at the outcomes of each student's or student group's investigation, and a discussion of why one result may differ from another, should emphasize the dynamics of group discussion and dialog rather than recitation and monolog. Discussion of variability of results should assist students in the identification of variables which may influence outcomes. The ability to express or talk about what was done is the skill involved here, with students operating primarily at the observing, identifying, describing, and comparing levels of cognition. Discussion of individual or group results provides the teacher with an opportunity to assess student understanding of the investigation and to recognize possibilities for further investigation, alternative activities to re-emphasize particular concepts, or review.
5. **ORGANIZING DATA** The ordering and grouping of recorded information makes it easier to interpret and see relationships. Included in this category are tabulation of data, averaging or deciding on best estimates, any visual representation such as line or bar graphs, and pictures or schematic representations. This is the most difficult of the skills directly related to data. For students to become proficient in organizing data often involves the inquiry skill of translating information into a different symbolic form.
6. **EXPLAINING, DEFENDING, AND ANSWERING WHY QUESTIONS** Here discussion is at a more sophisticated level than that previously considered. Explaining should assist in the development of the idea of cause and effect. It implies the students' understanding

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of the question, the procedures, and some ability to interpret results. Defending encourages confidence in one's procedures and interpretation of outcomes. Answering *why* questions requires an understanding of the questions and the tasks and ensures that students will analyze their data and make interpretations. Such questions as "WHERE DID THE HEAT ENERGY COME FROM?" "HOW DO YOU KNOW?" and "WHY ARE YOU TAKING THE TEMPERATURE OF ALL THREE CONTAINERS?" fall into this category. To answer such questions, the students must often operate at the inference level of cognition.

Specific examples of such questions are included in the *Teacher's Manual*. It seems particularly appropriate for the teacher to be asking individuals or groups these kinds of questions as they proceed with an investigation. In preparing the manual we emphasize, by providing questioning strategies, that discussion of this sort with individuals and small groups is an effective method of instruction which provides immediate feedback to the teacher.

7. ASKING QUESTIONS This category refers to student questions which are raised as a result of their observations, experiences, and experimenting. Teachers are given examples of the kinds of questions that students may raise and suggestions of how such questions should be dealt with.
8. IDENTIFYING VARIABLES Identification of those variables which may influence the outcome of an investigation is necessary if one is to understand the concept of a controlled experiment, make any sort of an appraisal of its design, and make an intelligent interpretation of its results. The first step toward these goals is to realize that many factors may influence an outcome, and to recognize and identify some of these factors. Students can learn much by asking about what affected the results. This skill is closely related to predicting.



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9. IDENTIFYING CONTROLS: Once the students are able to identify variables that may influence an outcome, the idea that all variables except the one under investigation must be held constant can be developed.
10. INTERPRETING RESULTS This is perhaps the most important of the problem-solving skills, and may be the most difficult to develop. Explicit models for teachers and students are provided. They deal with the data collected and interpret it in terms of the question asked. Emphasis is placed on recognizing the limitations of data and that the data may or may not have answered the question; on not going beyond the data; and on recognizing the need for further investigation if the need exists. Teachers are cautioned to avoid the temptation to ignore the data and simply provide "the answer."
11. DRAWING CONCLUSIONS Interpretation of results may warrant drawing conclusions. The emphasis here is on drawing only those conclusions that are supported by the data collected. Some forced conclusions are inevitable because of the difficulty of providing experimental evidence; however, great care is exercised to avoid forced conclusions for experiments that have provided all their own relevant data.
12. RECOGNIZING PROBLEMS AND FORMULATING QUESTIONS This skill is a necessary prerequisite for the general application of the other problem-solving skills outside the classroom situation. In other words, if we expect students to apply the problem-solving skills to their daily problems, it seems necessary that they be able to recognize that a problem exists and to state an appropriate question. To develop this skill, they are engaged and involved with events or phenomena that present an identifiable problem, and are given the opportunity to define that problem.

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### SPECIFYING STRATE

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13. DESIGNING EXPERIMENTS Once the students are able to recognize a problem and formulate a question, an experiment to answer that question may be designed. The design should include identification of variables and controls, methods for observation, gathering data, organizing and presenting data, and so on. It is assumed that this student population will be able to develop this skill only after a great deal of experience with the preceding ones.

#### SPECIFYING STRATEGIES FOR INSTRUCTION

The model for inquiry used in these materials specifies without exception a classroom climate in which the teacher is a catalyst and observer, and the students the active center of everything going on. Individually or in small groups the students are engaged in learning with the materials and activities of this program, and the teacher is pivotal in organizing, coordinating, *questioning and eliciting*, and observing - but not in telling. The teacher must be totally conscious of a role in providing the stimulus, while the student is generally unaware that he is being manipulated by strategy. The elicited student behavior may be *attitudinal, cognitive, or psychomotor: verbal or nonverbal*.

To communicate effectively with the teacher, we feel we must carefully describe as much as possible of the *pattern of interaction* upon which the anticipated results depend. The whole intent of this curriculum would be defeated if this pattern is not understood and implemented. We know, for example, that teachers often do not provide children the opportunity or the time to think for themselves when a problem is posed. They also frequently impose their experience, observations, and interpretations on children rather than allow the children to express *their own* views of things observed. We hope, therefore, to provide for teachers a model of strategy in these materials that will - if initially studied and used - demonstrate the benefits we describe for it in terms of student response and learning behavior.



## Me and my Environment

We do *not* anticipate that we can predict all that will occur with individual students in the classroom. We hope that we can, however, provide enough reminders to help the teacher deal with unexpected or unpredicted events in the same mode in which the materials are written.

### LEVELS OF GOALS AND OBJECTIVES

#### Unit Goals

Unit goals are broad general statements that define long-term goals of a major portion of the unit. An initial statement, "The student will," is understood in each of the goals. They are defined as statements that capture the intent and emphasis of the curriculum. They also serve the function of organizers toward which the core objectives are directed.

#### Core Objectives

The core objectives (stated in student behaviors) refer to the desired outcomes for sequences of activities. The role of these objectives is to summarize what the student will be able to do as a consequence of each of the activity sequences. The core objectives provide a cognitive map for the teacher to extend or elaborate on. These core objectives may also serve as evaluative guides to assess short-term progress and attainment of students.

#### Activity Objectives

Activity objectives are enabling or performance objectives that relate to the specific activity. Such objectives appear at both the beginning and the end of each activity. They identify the actions to be taken and the behaviors to be acquired by students to insure their success in achieving the broader objectives of the curriculum.

The role of the active specific instruction on student progress. It has repeated or rest performed, and produced to the minimum objective. The successful accomplishment dependent on each student should, therefore, be before moving on to

#### Anticipated Student

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#### TEACHING THE MATERIAL

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The role of the activity objective is to provide the teacher with specific instructional landmarks both to plot the course and to chart student progress. The objectives include information which the student has repeated or restated, experiences he has had, actions he has performed, and products he has made. Particular note should be paid to the minimum objectives as stated at the conclusion of the activity. The successful accomplishment of the succeeding activities is largely dependent on each student meeting these stated minimums. Some care should, therefore, be taken in making sure that the minimums are met before moving on to the next activity.

#### Anticipated Student Response Behaviors

Within an activity the anticipated behaviors are all the actions or interactions occurring during instruction. As listed for each activity, they describe what we predict students will do or say in response to some specific strategy.

#### TEACHING THE MATERIALS

It is often said that man is a curious animal and that the process and knowledge of science is a vehicle to capitalize on this phenomenon.

Science, then, for the EMH student, capitalizes on the student's natural curiosity about himself. Science is exciting, and ME AND MY ENVIRONMENT relies on this excitement. This science program has been designed to fit into the already existing curriculum framework and within modern teaching philosophies.

The amount of time spent on each activity can be tailored to fit the mood of the class and its teacher - that is, of you and your students. An average of 45 minutes may be required for all activities. Some activities will require extensive time, perhaps several days. The main point in teaching ME AND MY ENVIRONMENT is not to hurry - to allow sufficient time for inquiry to occur.



## Me and my Environment

The ME AND MY ENVIRONMENT sequence may span three years, or it may take less time. Make all the allowances you need to for your students, in setting the pace from activity to activity.

Particular attention has been given to articulating the science curriculum with the other parts of the instructional program. Sight vocabulary is included in many of the activities, and suggestions given for using these words in spelling and vocabulary lessons. Math skills are an integral part of science, and the lessons provide application of the student's math skills.

### Planning Guide

A planning guide is included in the introductory material to each core. Teaching the materials for the first time will require preparation time. Less time will be required after that. The teacher's planning guide will help you prepare materials in advance. For example, if a film is to be ordered, the planning guide will remind you when. The guide should be followed closely to initiate an activity.

### Overviews

Each unit and core of ME AND MY ENVIRONMENT is provided with a beginning "roadmap" to give you as the teacher an insight into the direction or groupings of activities.

### Rationale

Each unit and core is provided with a section to provide background into the *why* of the particular teaching content and physical materials used. These rationales should be read, thought about, and continually referred back to, in order for you to focus on and subsequently provide a consistent *why* philosophy in interactions with students.

### Background Information

Some pertinent curriculum itself have been incorporated at the beginning of each

### Clues To Success

A portion of ME AND MY ENVIRONMENT formance tasks. information about data about the student tests, nor were the

Because the student population incorporated into was made, and it edition of activities tallysheets give and instruction. the unique opportunity for the next activity review of certain

Further discussion in the expendable of Progress.



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### Background Information

Some pertinent points which are not necessarily developed in the curriculum itself, but which will provide you with useful information, have been incorporated in the Background Information section at the beginning of each core.

### Clues To Success

A portion of the evaluation program during the field testing of ME AND MY ENVIRONMENT involved the use of objective questions and performance tasks. The items used were specifically designed to secure information about students' background knowledge as well as to secure data about the success of the materials. They were not intended as tests, nor were they used in that way to evaluate the youngsters.

Because the design of these items proved highly effective with this student population, many of the questions and situational tasks were incorporated into the second experimental edition. Further refinement was made, and it has resulted in the inclusion throughout this commercial edition of activities titled Clues To Success. These along with their tallysheets give you immediate feedback on the effectiveness of materials and instruction. At the point of use of each of these activities, you have the unique opportunity to determine whether or not your students are ready for the next activity or whether a modification, repetition, extension, or review of certain activities is necessary before proceeding.

Further discussion of the uses of the Clues To Success are included in the expendable section of this introduction entitled Student Record of Progress.



## Me and my Environment

### Worksheets

The worksheets in the program are used in a variety of ways: a) as reinforcement to general or specific objectives; b) to introduce new information and to record data; c) to enhance the interest in an activity; d) as a culminating activity to review what has been covered in previous lessons. Difficult worksheets are duplicated on daylight slides (which may be projected on the chalkboard and written on there, during discussions). Worksheets may be introduced on the chalkboard before they are attempted by the individual students.

### 35 mm Slides

A colorful visual medium broadens instructional opportunities, especially during inquiry activities. The projected images of the slides should be used both by you and by most students during instruction. The teaching strategies give specific instructions.

Some of the slides, as noted, are duplications of various worksheets. They are specially processed for daylight projection: you need not completely darken your classroom. Students should be able to write or read at their desks or move from their desks to the chalkboard to write directly on the image with chalk while a slide is being shown. You should, however, turn off any lights or shade any windows whose light is reflected directly from the chalkboard. For adequate projection, use a 500-watt bulb.

For other slides, which are photographic scenes and for which there is no necessity to write on the projected image darken your classroom. These slides should be projected on a regular screen.

The largest possible image is usually best for the students to see clearly. Therefore, place the slide projector as far as possible from the chalkboard or screen, but not so far that the image projected extends above or below the edges of the board or screen.

Be sure that you use the Carousel Projector for insertion and projection.

### Filmstrips

For activities to promote one objective or Ektagraphic projection of the slides, we recommend the Adapter. It is inexpensive projector.

### Games

Perhaps the most certain objectives to provide variation in dramatize some of the give experience in class.

### Booklets

This medium is used. It combines a minimum of somewhat detailed facts.

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\* Except the Kodak Carousel systems are not compatible.



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Be sure that you are familiar with the operating instructions for the Carousel Projector and that you observe the manufacturer's cautions for insertion and projection of slides, trays, bulbs, and lenses.

### Filmstrips

For activities in which an entire series of slides will be used to promote one objective, a filmstrip has been made. If a Kodak Carousel\* or Ektagraphic projector is the type to be used for the projection of the slides, we recommend the purchase of the Kodak Ektagraphic Filmstrip Adapter. It is inexpensive and will preclude the use of a second projector.

### Games

Perhaps the most ambitious of the endeavors has been to promote certain objectives through the use of games and game theory. Besides providing variation to the instructional mode, the games are used to dramatize some of the major concepts in the curriculum, as well as to give experience in cooperation and taking turns.

### Booklets

This medium is used as a variation to the worksheets and 35 mm slides. It combines a minimum of reading with cartooned illustrations to present somewhat detailed factual information.

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\* Except the Kodak Carousel Sand S and S-AV projectors. The optional systems are not compatible.





## Me and my Environment

### Posters

When something is referred to often enough, it is sometimes advisable to present it in a large format. In these instances a 24" X 36" poster has been developed for convenient posting and frequent inspection.

### Study Cards

Thirty-two photographic study cards have been prepared to provide further variation in the mode of presentation. They are designed for use with specific activities and to form the nucleus for a collection of photographs for bulletin board displays.

### Polaroid Camera

To increase the opportunities for involving all students in the activities, a Polaroid camera is suggested as an optional part of the instructional materials. An activity designed to introduce your students to this camera is included as the first Change Of Pacer in the back of this *Teacher's Manual*. The camera was provided through the courtesy of the Polaroid Corporation during the field testing, but it cannot be supplied on this basis in quantity.

In most instances, in the field tests, the camera in the classroom served as a valuable motivational device for the students, as well as a help in prolonging their ever-so-short interest spans. Because of these successes, a Polaroid camera is strongly recommended. It has not been included as an integral portion of the basic kit, because of the potential cost of film and flashcubes.

### Camera Log Book

An excellent means of recording and preserving class activities and student experiences is through the development of a class log

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### Change Of Pacers

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book. To keep a log book, either make or purchase a photo album. Students may share the responsibility of collecting and mounting snapshots, titling each cluster of pictures, and writing a descriptive sentence or short poem to recollect what occurred in a particular picture.

The log book helps to build student ego and class morale. Students can browse through it periodically to recall what they looked like and what they accomplished alone and with other students in previous months. The teacher may use it as a change of pacer to help students recall and review specific concepts and activities, and to provide practice in written and verbal communication skills.

#### Change Of Pacers

At the back of this *Teacher's Manual* you will find the section called Change Of Pacers. There, numerous examples and suggestions are offered for those days when it is difficult to adhere to your regular schedule. These probably include days just prior to or immediately following a vacation, other days during the occurrence of severe snow storms or cold weather, and periods of high absenteeism due to epidemics, assembly programs, and so forth. So that these days will not be wasted, we have suggested a variety of enrichments, reviews, or extensions that complement and add to this curriculum. Use these activities, then, as the name implies, to provide those refreshing breathers to give your program the added zip that is necessary to offset those occurrences in scheduling over which you have no control.

#### Student Folders

A set of decals has been included with your *Teacher's Manual*. These are to be placed on the cover of a three ring binder or folder in which your students will keep their worksheets as they are completed. Reference is often made to worksheets already completed, and they are necessary at various points in the program. The folder provides you and the students with an efficient and convenient mechanism for maintaining their own files of science activities.



## Me and my Environment

### Team Size And Science Materials

The quantities of materials provided in the kit are based on a class size of sixteen students, or four teams of four each, or eight teams of two each. In the case of smaller numbers of students, you may find it advantageous to reduce the number of students working in a team. Likewise, in cases of larger numbers of students, the teams should be enlarged, or additional materials ordered.



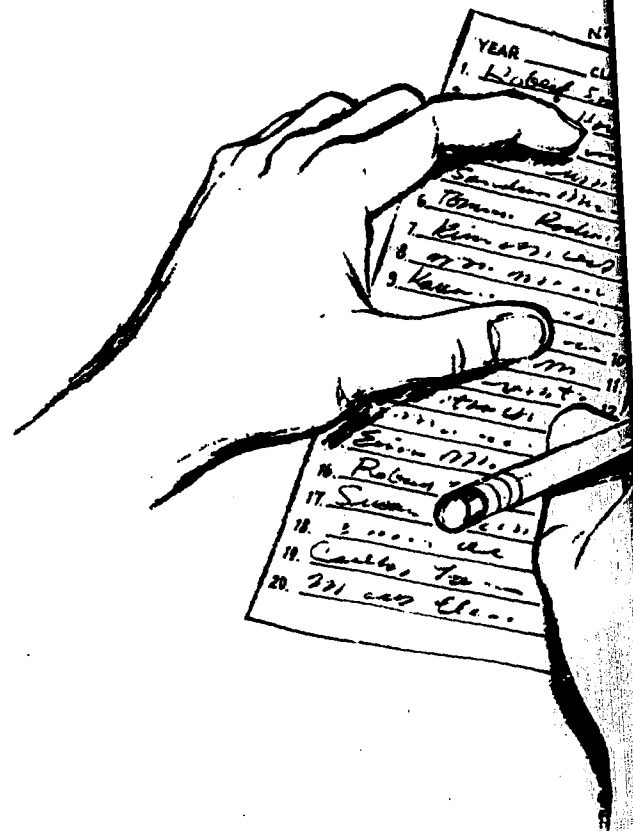
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# Me and My Environment

DIRECTIONS FOR



# DIRECTIONS FOR USING THE STUDENT RECORD OF PROGRESS

**UNIT 4 Exploration**

NT RECORD OF STUDENT PROGRESS BACKGROUND AND DEVELOPMENT SECTION

YEAR	CLASS	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
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3. ...	3.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
4. ...	4.	(YES) NO	YES NO	(YES) NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
5. ...	5.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
6. ...	6.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
7. ...	7.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
8. ...	8.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
9. ...	9.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
10. ...	10.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
11. ...	11.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
12. ...	12.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
13. ...	13.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
14. ...	14.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
15. ...	15.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
16. ...	16.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
17. ...	17.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
18. ...	18.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
19. ...	19.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO
20. ...	20.	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO	YES NO



## Me and my Environment

### UNIT IV STUDENT RECORD OF PROGRESS INTRODUCTION

#### USES OF RECORD

Throughout each unit of ME AND MY ENVIRONMENT are Clues to Success activities which provide immediate feedback on the effectiveness of the materials and instruction. The Student Record of Progress helps you organize this information. This record will allow you to judge the effectiveness of instruction for your class at many points in the curriculum. It will also allow you to monitor the individual progress of students and set different standards of success for different children.

The Clues to Success activities and this Record are not intended for use as a grading system. Use it to make decisions, repeat or extend instruction, or to decide when to move on to the next activity. Use it to decide how to divide the class into teams for specific activities, and to assure the success of every student.

The two most important functions of the Student Record of Progress are:

1. To assess background and understanding: It rejects the notion that a single measure, like an IQ test, can tell what a child is able to do for all time. Instead, it enables the teacher to identify the level of skills and understandings related to each core of activities.
2. To assure success: It rejects the idea of sorting children into those who know or can do and those who can't. Instead, it provides a way for the teacher to direct his or her efforts toward the students needing greatest support in specific skills or concepts, so those students can achieve success.

The Student Record of Progress contains five main sections: Background and Development, Understanding, Participation, Summary of Progress, and Tallysheets for the Clues to Success activities.

#### BACKGROUND AND DEVELOPMENT

A child's success background of experiences is also central to success skills, the ability to give an answer. Following are also important. Weak in some areas but specific skills, assessed in these areas and will. This section provides a profile for each student.

The assessments of where your students are. The results will suggest teach the materials. teamed with a more able frustrated in doing the

No student is uniform. Some go through spurts of prejudging children. of initial competencies background and development out the materials. The which skills are assessed

Progress in Following Background and Development essential for maximum sense of competence in those students in need

UNIT IV  
STUDENT RECORD OF PROGRESS  
INTRODUCTION



BSCS

BACKGROUND AND DEVELOPMENT SECTION

A child's success on each core of activities is dependent on his background of experiences with those particular concepts. Some basic skills are also central to success with these materials, especially problem-solving skills, the ability to recognize what the question is and what might lead to an answer. Following directions, working with one's hands, and categorizing are also important skills. You will find that some students will be weak in some areas but quite good in others. As the materials demand specific skills, assessments are provided to identify students who are low in these areas and will need extra attention and support to achieve success. This section provides a means of recording these assessments to develop a profile for each student.

The assessments of Background can be thought of as pretests measuring where your students are when instruction in certain areas is introduced. The results will suggest what responses are reasonable to expect when you teach the materials. If a student who is less able in those skills is teamed with a more able student, he might be more successful and less frustrated in doing the activities.

No student is uniformly low (or high) in all skills and experiences. Some go through spurts of development. Background assessments help avoid prejudging children. They serve to correct underestimates and overestimates of initial competencies and experience. Assessments of the most important background and developmental skills are periodically interspersed throughout the materials. The Overview page following this introduction indicates which skills are assessed at various points in the year.

Progress in Following Directions is the first record page in the Background and Development Section. Ability to follow directions is essential for maximum success on activities and for building a personal sense of competence in and control over one's environment. Identify those students in need of special help and follow their progress.



## Me and my Environment

### UNIT IV STUDENT RECORD OF PROGRESS INTRODUCTION (continued)

#### BACKGROUND AND DEVELOPMENT SECTION (continued)

At three points in Unit IV you are asked to rate your student's ability to follow directions. Clues to Success activities at these points provide an objective measure of students' abilities. Combining these two sources of information should reveal which students need closest supervision and support in order to achieve success.

Development of Experience is the second record page in the Background and Development Section. This page allows you to follow each student's progress in observing and recording. These skills develop through repeated experience and are not learned through a single activity. Therefore, this section should be used to identify the experience level at which each student is operating rather than to grade students. Those students who are rated poor in observation skills and who can not record observed data will need to be provided with many opportunities to observe and record.

#### UNDERSTANDING SECTION

A sense of progress and achievement is something students need help to realize. This record is one way you can show students they are learning. A log of student performance also lets you see the progress of the class as well as of individual students. To help identify strengths and weaknesses of groups in the class, tallysheets are included for some Clues to Success activities. These tallysheets can be found at the end of the Student Record of Progress.

Several aspects of accountability are provided by this section. First, and most important, the teacher has an accounting of his or her own effectiveness in instruction. Over a period of time there should be fewer students who are unsuccessful. Should many in the class show a consistent lack of success, it may be that these materials are inappropriate for that particular group of students. This log of student performance can also provide evidence of learning and progress to parents and the school.

Finally, the Summation to consider education classes

#### PARTICIPATION

The four major learning of specific of a sense of self relationships with abilities. This section of following and

Responsibility section. Students to carry things out tant in every day that each child g animals, set up a up science equipment to note students. Plan additional o provide the support

Sometimes st You may not be co actions. As a ma and interests, it the year. To ass ratings of studen

Cooperation Closely related to



UNIT IV  
STUDENT RECORD OF PROGRESS  
INTRODUCTION (continued)



BSCS

your student's ability  
these points provide  
g these two sources  
st supervision and

Finally, the Summary of Progress Section may reveal students who are inappropriately placed. It certainly should provide additional information to consider in any review of the placement of students in special education classes.

PARTICIPATION

ge in the Background  
ow each student's  
elop through repeated  
ty. Therefore, this  
n at which each  
hose students who are  
d observed data will  
and record.

The four major aims of ME AND MY ENVIRONMENT involve far more than the learning of specific information and skills. They include the development of a sense of self-worth, successful behaviors for daily life, attitudes, relationships with others, and the ability to assume various responsibilities. This section of the Student Record of Progress provides a means of following and encouraging the development of some of these behaviors.

Students need help to  
they are learning. A  
ess of the class as  
ngths and weaknesses  
ome Clues to Success  
of the Student

Responsibility and Involvement is the first record page in this section. Students need many opportunities to assume responsibility and to carry things out on their own. Of course this is tremendously important in every day experiences. Use this page as a planning guide to see that each child gets the chance to do such things as care for plants and animals, set up and operate audio-visual equipment, distribute and clean up science equipment, prepare bulletin boards, etc. Use this section also to note students who have difficulty following through on responsibilities. Plan additional opportunities for these children (not as penalties) and provide the support needed for them to successfully accomplish their task.

this section. First,  
is or her own effec-  
should be fewer  
ss show a consistent  
approx. rate for that  
formance can also  
nd the school.

Sometimes students' attitudes and involvement shift during the year. You may not be conscious of the shift without purposely reviewing students' actions. As a major aim of the curriculum is to develop certain attitudes and interests, it is useful to consider this dimension several times during the year. To assist you in this review, the page provides space to record ratings of student attitudes and participation.

Cooperation and Perverserance is the second page of this section. Closely related to the assumption of responsibilities and involvement



## Me and my Environment

### UNIT IV STUDENT RECORD OF PROGRESS INTRODUCTION (continued)

#### PARTICIPATION (continued)

in activities is the day-to-day participation of students. Sometime personal behavior problems prevent success or interfere with the work of the class. A page in the Accomplishments Section is provided to record cooperative social behavior and completion of daily work in science. Students often need help to recognize problems which interfere with their learning. It is sometimes effective to have students who are encountering difficulties assist in rating their own daily performance.

Students also need recognition and praise for showing initiative, perserverance, or extra effort. This record may be used to identify those students who have put forth extra effort or have been involved in activities. Such behavior should be reinforced by the teacher.

#### SUMMARY OF PROGRESS

In order to obtain a summary of progress, a system has been developed for each student. This system is used to record progress in another and across areas of study to apply this system.

#### TALLYSHEET SECTION

When reference is made to the tallysheet, find the Record of Progress. This section is used for interpreting student progress for revealing strengths and weaknesses in a group. They also show progress in the Record of Progress.

#### USE OF CLASS LIST

On page 24 you will find the Student Record of Progress. This section is used to record your student's names and progress.

UNIT IV  
STUDENT RECORD OF PROGRESS  
INTRODUCTION (continued)



BSCS

SUMMARY OF PROGRESS

In order to obtain a comprehensive view of each child's progress, a system has been developed for comparing results from one point in time to another and across all of the records of skills and understandings. Steps to apply this system are described in the last activity in the unit.

TALLYSHEET SECTION

When reference is made in a Clues to Success activity to the use of a tallysheet, find the appropriate one in the last section of the Student Record of Progress. The tallysheets contain guidelines for scoring and interpreting student work. They organize the results in a convenient way for revealing strengths and weaknesses in understanding for the class as a group. They also simplify recording results in the Student Record of Progress.

USE OF CLASS LIST

On page 24 you will find a Class List card for use in making entries in the Student Record of Progress. This card eliminates the need to list your student's names more than once.

STUDENT RECORD OF PROGRESS  
UNIT IV OVERVIEW

	Pages of <u>Record</u> Where Results Are Recorded	Background, Understandings, and Participation Sampled	CORE A  Act. 4-0 - 4-7	Act. 4-8
BACKGROUND AND DEVELOPMENT SECTION	Progress in Following Directions	Following Directions	4-7	
	Development of Experience	Observation  Recording		4-10  4-10
UNDERSTANDING  SECTION	Concepts	Concepts	4-1 4-2 4-7	
	Problem Solving	Outcomes (Results and Implications)	4-7	
PARTICIPATION  SECTION	Responsibility and Involvement	Involvement  Responsibilities	4-7  Weekly Record	
	Cooperation and Perseverance	Social Behavior  Task Behavior	Record For Each Activity  Record For Each Activity	

STUDENT RECORD OF PROGRESS  
UNIT IV OVERVIEW

Found, standings, participation ed	CORE A Act. 4-0 - 4-7	CORE B Act. 4-8 - 4-19	CORE C Act. 4-20 - 4-28
ving tions	4-7	4-19	4-27
ration ing		4-10 4-13 4-14 4-10 4-13 4-14	
ts	4-1 4-2 4-7	4-19	4-27 4-28
es ts and ations)	4-7	4-16	
ement	4-7	4-19	4-28
sibilities	Weekly Record		
Behavior	Record For Each Activity		
ehavior	Record For Each Activity		

UNIT IV  
STUDENT RECORD OF PROGRESS  
BACKGROUND AND DEVELOPMENT SECTION  
PROGRESS IN FOLLOWING DIRECTIONS

Teacher Rating:

Prior to each activity assessing the ability to follow directions, rate each child's ability to follow directions by circling a number from 0 to 5. The higher the number circled, the more able you believe the child is to carry out a task or sequence of activities with little supervision.

Activity Scores:

Follow the guidelines in the Clues to Success Activities 4-7, 4-19, and 4-27 to obtain a "following directions" score for each student. Combine your rating with this score to determine who needs help most. Provide close supervision and support to help these students be successful. Team them with more able students. Plan special opportunities for them to practice following directions.

STUDENT NUMBER	TCHR. RATING START OF ACT. 4-7					ACT. 4-7 SCORE YES PART NO	WHO NEEDS HELP MOST?	TCHR. RATING START OF ACT. 4-19					ACT. 4-19 SCORE YES PART NO
	LOW				HIGH			LOW				HIGH	
1.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
2.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
3.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
4.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
5.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
6.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
7.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
8.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
9.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
10.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
11.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
12.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
13.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
14.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
15.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
16.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
17.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
18.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
19.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO
20.	0	1	2	3	4 5	YES PART NO		0	1	2	3	4 5	YES PART NO

## Year

[illegible]

UNIT IV  
STUDENT RECORD OF PROGRESS  
BACKGROUND AND DEVELOPMENT SECTION  
DEVELOPMENT OF EXPERIENCE

STUDENT NUMBER	ACTIVITY 4-10		WHO NEEDS HELP		ACTIVITY 4-13	
	ABILITY TO OBSERVE	CAN RECORD RESULTS			ABILITY TO OBSERVE	CAN RECORD RESULTS
			O	R		
1.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
2.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
3.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
4.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
5.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
6.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
7.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
8.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
9.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
10.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
11.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
12.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
13.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
14.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
15.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
16.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
17.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
18.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
19.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP
20.	GOOD FAIR POOR	YES HELP NO			GOOD FAIR POOR	YES HELP



Year \_\_\_\_\_

UNIT IV  
STUDENT RECORD OF PROGRESS  
UNDERSTANDING SECTION  
CONCEPTS

STUDENT NUMBER	ACT. 4-1		ACT. 4-2					ACT. 4-7		CORE A CONCEPTS WHO IS:	ACT. 4-8	
	FOOD CHAINS		TRANSFER CONCEPT					TRANSFER OF ENERGY			CYCLE	
This record reveals as much about your instruction as it does about your stu- dents' understanding of these concepts. If you note that the same students have difficulty grouping ideas throughout the unit, aim your instruction at them. This could result in all achieving success.	1.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	2.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	3.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	4.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	5.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	6.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	7.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	8.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	9.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	10.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	11.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
This record also provides an indica- tion of retention of ideas over a longer period of time.	12.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	13.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	14.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	15.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	16.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	17.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	18.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	19.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES
	20.	YES NO	0	1	2	3	4	5	YES NO	HIGH LOW	YES NO	YES

Teacher \_\_\_\_\_  
Year \_\_\_\_\_



ERIC  
Full Text Provided by ERIC

UNIT IV  
STUDENT RECORD OF PROGRESS  
UNDERSTANDING SECTION  
CONCEPTS (continued)

STUDENT NUMBER	ACTIVITY 4-27			ACTIVITY 4-28 CONCEPTS					
	MICROBES	RECYCLING	CORE C CONCEPTS WHO IS:	COMPOST	FOODCHAINS	LONG JOURNEY	FOOD WEBS	INTER- DEPENDENCE	
1.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
2.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
3.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
4.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
5.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
6.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
7.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
8.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
9.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
10.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
11.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
12.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
13.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
14.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
15.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
16.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
17.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
18.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
19.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	
20.	YES NO	YES NO	HIGH LOW	HIGH SOME LOW	HIGH SOME LOW	YES NO	YES NO	YES NO	

Teacher \_\_\_\_\_  
Year \_\_\_\_\_

[illegible]

UNIT IV  
STUDENT RECORD OF PROGRESS  
UNDERSTANDING SECTION  
CONCEPTS (continued)

STUDENT NUMBER	ACTIVITY 4-28 CONCEPT REVIEW QUESTIONS											
	Food Cycle		Garbage		Decompose		Recycling		Less Garbage		Recycling Payoff Gam	
1.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
2.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
3.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
4.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
5.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
6.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
7.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
8.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
9.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
10.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
11.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
12.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
13.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
14.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
15.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
16.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
17.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
18.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
19.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
20.	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO

UNIT IV  
STUDENT RECORD OF PROGRESS  
UNDERSTANDING SECTION  
CONCEPTS (continued)

Teacher \_\_\_\_\_

Year \_\_\_\_\_

ACTIVITY 4-28 CONCEPT REVIEW QUESTIONS						STUDENT PROGRESS IN UNIT IV					
Decompose		Recycling		Less Garbage		Recycling Payoff Game		HIGH	GROWTH	LOSS	LOW
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____
YES	NO	YES	NO	YES	NO	YES	NO	_____	_____	_____	_____



UNIT IV  
STUDENT RECORD OF PROGRESS  
UNDERSTANDING SECTION  
PROBLEM SOLVING

This page of the Student Record of Progress provides the opportunity to record information regarding a student's ability to engage in problem-solving behaviors. Problem solving, like reasoning, is one of the higher inquiry skills which requires both time and a variety of experience to develop.

The activities upon which this page is based require the student to be able to predict outcomes. This is a difficult task.

Many students will not have been expected to engage in problem solving in the past. Therefore, their limited background will, likewise, limit their present performance.

As with each of the other skills and abilities which you are attempting to develop, the development of problem solving will require giving students many experiences with manipulating experiments and data.

STUDENT NUMBER	ACT. 4-7		ACT. 4-16	
	Effects On Food Webs		Food Storage	
1.	YES	NO	YES	NO
2.	YES	NO	YES	NO
3.	YES	NO	YES	NO
4.	YES	NO	YES	NO
5.	YES	NO	YES	NO
6.	YES	NO	YES	NO
7.	YES	NO	YES	NO
8.	YES	NO	YES	NO
9.	YES	NO	YES	NO
10.	YES	NO	YES	NO
11.	YES	NO	YES	NO
12.	YES	NO	YES	NO
13.	YES	NO	YES	NO
14.	YES	NO	YES	NO
15.	YES	NO	YES	NO
16.	YES	NO	YES	NO
17.	YES	NO	YES	NO
18.	YES	NO	YES	NO
19.	YES	NO	YES	NO
20.	YES	NO	YES	NO



UNIT IV  
STUDENT RECORD OF PROGRESS  
UNDERSTANDING SECTION  
PROBLEM SOLVING

Teacher \_\_\_\_\_

Year \_\_\_\_\_

STUDENT NUMBER	ACT. 4-7 Effects On Food Webs		ACT. 4-16 Food Storage		NOTES
1.	YES	NO	YES	NO	
2.	YES	NO	YES	NO	
3.	YES	NO	YES	NO	
4.	YES	NO	YES	NO	
5.	YES	NO	YES	NO	
6.	YES	NO	YES	NO	
7.	YES	NO	YES	NO	
8.	YES	NO	YES	NO	
9.	YES	NO	YES	NO	
10.	YES	NO	YES	NO	
11.	YES	NO	YES	NO	
12.	YES	NO	YES	NO	
13.	YES	NO	YES	NO	
14.	YES	NO	YES	NO	
15.	YES	NO	YES	NO	
16.	YES	NO	YES	NO	
17.	YES	NO	YES	NO	
18.	YES	NO	YES	NO	
19.	YES	NO	YES	NO	
20.	YES	NO	YES	NO	

STUDENT RECORD OF PROGRESS  
PARTICIPATION SECTION  
RESPONSIBILITY AND INVOLVEMENT

## ASSIGNMENT OF RESPONSIBILITIES

Many tasks should be shared by students. Use this log to assign responsibilities by the week (or other time period). Some tasks and codes for them are listed; add others of your own:

AV--set up and operate audio-visual equipment  
(projector, recorder, etc.)

P --care for plants

A --care for animal pet

T --care for terraria plants and animals

F --care for fish and pond

E --get out, clean, and put away science equipment

BB--prepare bulletin board

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Enough space is provided to enter a date for a second chance to do various tasks as time permits. There is also enough space to record whether the student completed the task:

0 = on his own without reminders or assistance

R = on his own after reminding

H = with someone's help

### RATING OF INVOLVEMENT

At three points in the course of Unit IV, rate each student's involvement and interest in science activities by circling a number from 0 to 5 in the appropriate column. Rate students 0 if they are completely uninterested or apathetic; rate them 5 if they are extremely excited and involved in doing things in science.

STUDENT  
NUMBER

DENT BER	TASK	AV	P	A
1.	DATE & SUCCESS			
2.	DATE & SUCCFSS			
3.	DATE & SUCCESS			
4.	DATE & SUCCESS			
5.	DATE & SUCCESS			
6.	DATE & SUCCESS			
7.	DATE & SUCCESS			
8.	DATE & SUCCESS			
9.	DATE & SUCCESS			
10.	DATE & SUCCESS			
11.	DATE & SUCCESS			
12.	DATE & SUCCESS			
13.	DATE & SUCCESS			
14.	DATE & SUCCESS			
15.	DATE & SUCCESS			
16.	DATE & SUCCESS			
17.	DATE & SUCCESS			
18.	DATE & SUCCESS			
19.	DATE & SUCCESS			
20.	DATE & SUCCESS			

STUDENT RECORD OF PROGRESS  
PARTICIPATION SECTION  
RESPONSIBILITY AND INVOLVEMENT

Teacher \_\_\_\_\_  
Year \_\_\_\_\_

		ASSIGNMENT OF RESPONSIBILITIES											
STUDENT NUMBER	TASK	AV	P	A	T	F	E	BB	—	—	—	—	—
1.	DATE & SUCCESS												
2.	DATE & SUCCESS												
3.	DATE & SUCCESS												
4.	DATE & SUCCESS												
5.	DATE & SUCCESS												
6.	DATE & SUCCESS												
7.	DATE & SUCCESS												
8.	DATE & SUCCESS												
9.	DATE & SUCCESS												
10.	DATE & SUCCESS												
11.	DATE & SUCCESS												
12.	DATE & SUCCESS												
13.	DATE & SUCCESS												
14.	DATE & SUCCESS												
15.	DATE & SUCCESS												
16.	DATE & SUCCESS												
17.	DATE & SUCCESS												
18.	DATE & SUCCESS												
19.	DATE & SUCCESS												
20.	DATE & SUCCESS												

**STUDENT RECORD OF PROGRESS  
PARTICIPATION SECTION  
RESPONSIBILITY AND INVOLVEMENT (continued)**

STUDENT NUMBER		RATING OF INVOLVEMENT			STUDENT PROGRESS IN	
		AFTER ACT. 4-7	AFTER ACT. 4-19	AFTER ACT. 4-'8	HIGH RESP. INVOLV.	ADEQUATE RESP. INVOLV.
1.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
2.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
3.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
4.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
5.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
6.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
7.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
8.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
9.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
10.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
11.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
12.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
13.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
14.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
15.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
16.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
17.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
18.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
19.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		
20.	DATE & SUCCESS	0 1 2 3 4 5	0 1 2 3 4 5	0 1 2 3 4 5		

Teacher \_\_\_\_\_  
Year \_\_\_\_\_

STUDENT RECORD OF PROGRESS  
PARTICIPATION SECTION  
RESPONSIBILITY AND INVOLVEMENT (continued)

[illegible]

STUDENT RECORD OF PROGRESS  
PARTICIPATION SECTION  
COOPERATION AND PERSEVERANCE

A record sometimes helps clarify persistent learning problems. Sometimes students can gain in self-awareness by assisting in recording their own daily performance. In this way they become aware of the frequency with which problems occur.

To make an entry in the record, simply make a minus or plus mark (-, +) to indicate a problem or positive behavior. Much white space (lack of entries) for a student would denote generally good social and task-related behaviors.

Two columns under each activity allow you to record several types of behavior. For either category, you should decide on the items of behavior to include. If some of the behaviors below are appropriate, check them off, or write in your own.

S --Social behavior might include:

- ☐ non cooperation with a team
- ☐ aggressiveness toward others
- ☐ nonparticipation
- ☐ outbursts

T --Task-related behavior might include:

- ☐ not completing the work for an activity
- ☐ forgetting to bring necessary things
- ☐ not carrying out responsibilities
- ☐ doing things not related to the task

Compare this record with the students' success and functional abilities to see if any patterns are apparent. Remember that different relationships may exist for different students.

NOTES:

[illegible]

Teacher \_\_\_\_\_  
 Year \_\_\_\_\_

STUDENT RECORD OF PROGRESS  
 PARTICIPATION SECTION  
 COOPERATION AND PERSEVERANCE

STUDENT NUMBER	ACTIVITIES													
	1	2	3	4	5	6	7	8	9	10	11	12	13	
	S T	S T	S T	S T	S T	S T	S T	S T	S T	S T	S T	S T	S T	
1.														
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														
11.														
12.														
13.														
14.														
15.														
16.														
17.														
18.														
19.														
20.														

NOTES:

functional  
 member that  
 ents.

STUDENT RECORD OF PE  
PARTICIPATION SEC  
COOPERATION AND PERSEVERANCE

STUDENT  
NUMBER

ACTIVITIES

14	15	16	17	18	19	20	21	22	23	24
S T	S T	S T	S T	S T	S T	S T	S T	S T	S T	S T
1.										
2.										
3.										
4.										
5.										
6.										
7.										
8.										
9.										
10.										
11.										
12.										
13.										
14.										
15.										
16.										
17.										
18.										
19.										
20.										

NOTES:



STUDENT RECORD OF PROGRESS  
PARTICIPATION SECTION  
COOPERATION AND PERSEVERANCE (continued)

[illegible]

**STUDENT RECORD OF PROGRESS**  
**SUMMARY OF STUDENT PROGRESS IN UNIT IV**

<p>From your summaries of each page, list the students with the <u>LEAST</u> Background, Understanding, and Accomplishments in Unit IV. For those whose names appear in many columns, make special plans to insure their future success.</p>	<b>LOW IN BACKGROUND AND DEVELOPMENT</b>		<b>LOW IN UNDERSTANDING</b>	
	Following Directions	Observing and Recording	Concepts	Problem Solving
NOTES:				
<p>From your summaries of each page, list the students with the <u>MOST</u> Background, Understanding, and Accomplishments in Unit IV. Review their work in other subjects and the appropriateness of their placement in this class.</p>	<b>HIGH IN BACKGROUND AND DEVELOPMENT</b>		<b>HIGH IN UNDERSTANDING</b>	
	Following Directions	Observing and Recording	Concepts	Problem Solving

Teacher \_\_\_\_\_  
Year \_\_\_\_\_



ERIC  
Full Text Provided by ERIC

For each of the questions in Activities 4-1 and 4-2, circle YES if the student's answer is acceptable. Otherwise, circle NO.

STUDENT NUMBER KEY

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.
- 9.
- 10.
- 11.
- 12.
- 13.
- 14.
- 15.
- 16.
- 17.
- 18.
- 19.
- 20.

ACTIVITY 4-1		
CONCEPTS PAGE		
Hawk Chain	Man Chain	Lion Chain
1	2	3
Snake & Grass or Grain	Grass or Grain	Chicken & Insects or Worms
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO
YES NO	YES NO	YES NO

Caterpillar
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES
YES

GROUP TOTALS

Does this review give an accurate indication of student understanding?  
If not, what other evidence do you have of student learning?

## TALLYSHEET 4-1

-1 (WORKSHEET 4-1) AND ACTIVITY 4-2 (WORKSHEET 4-2)

[illegible][illegible]

Do they give an accurate indication of student understanding?

☐ YES☐ NO

ERIC  
ence do you have of student learning?

# ANIMALS

TALLYSHEET 4-2

ACTIVITY 4-5

STUDENT TEAMS															No. of animals found
Team 1 _____ _____															
Team 2 _____ _____															
Team 3 _____ _____															
Team 4 _____ _____															
Team 5 _____ _____															
Team 6 _____ _____															
Team 7 _____ _____															
Team 8 _____ _____															
Team 9 _____ _____															

Send this sheet in with the Activity 5 Feedback Form.

[illegible]

DIRECTIONS PAGE										CONCEPTS PAGE		
Following Directions										Plants		
Teacher Rating						Score				1		
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	
0	1	2	3	4	5	YES	PART	NO	Plants	Man	Other	

STUDENT NUMBER

Copy the rating and score for following directions which were recorded in the Student Record of Progress.

Question 1: Circle the word that each student marked.

Questions 2, 3, and 4: Circle the letter that each student marked.

GROUP TOTALS

Does this review give an accurate indication of

If not, what other evidence do you have of stud



this review give an accurate indication of student learning? ☐ YES ☐ NO  
 What other evidence do you have of student learning?

TALLYSHEET 4-4  
ACTIVITY 4-16 (WORKSHEET 4-6)

For each question in  
Activity 4-16, circle  
the letter that each  
student marked.

STUDENT NUMBER

PROBLEM-SOLVING PAGE			
Milk in Refrigerator		Wet and Warm	Unwrapped San
1		2	3
KEY	A B C D	A B C D	A B C D
1.	A B C D	A B C D	A B C D
2.	A B C D	A B C D	A B C D
3.	A B C D	A B C D	A B C D
4.	A B C D	A B C D	A B C D
5.	A B C D	A B C D	A B C D
6.	A B C D	A B C D	A B C D
7.	A B C D	A B C D	A B C D
8.	A B C D	A B C D	A B C D
9.	A B C D	A B C D	A B C D
10.	A B C D	A B C D	A B C D
11.	A B C D	A B C D	A B C D
12.	A B C D	A B C D	A B C D
13.	A B C D	A B C D	A B C D
14.	A B C D	A B C D	A B C D
15.	A B C D	A B C D	A B C D
16.	A B C D	A B C D	A B C D
17.	A B C D	A B C D	A B C D
18.	A B C D	A B C D	A B C D
19.	A B C D	A B C D	A B C D
20.	A B C D	A B C D	A B C D

GROUP TOTALS

Does this review give an accurate indication of student

If not, what other evidence do you have of student learn

## ACTIVITY 4-16 (WORKSHEET 4-6)

[illegible]☐ NO

ERIC  
Full Text Provided by ERIC

TALLYSHEET 4-5  
ACTIVITY 4-19 (WORKSHEET 4-7)

		FOLLOWING DIRECTIONS PAGE										CONC									
		Following Directions										Cycle					Microbes Bre				
		Teacher Rating					Score					1					2				
KEY	STUDENT NUMBER	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	1.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	2.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	3.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	4.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	5.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	6.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	7.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	8.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	9.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	10.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	11.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	12.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	13.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	14.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	15.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	16.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	17.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	18.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	19.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			
	20.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D	A	B	C	D			

GROUP TOTALS

Does this review give an accurate indication of student learning?

If not, what other evidence do you have of student learning?

TALLYSHEET 4-5  
ACTIVITY 4-19 (WORKSHEET 4-7)

[illegible]

☐ YES

☐ NO

What other evidence do you have of student learning?

TALLYSHEET 4-6  
ACTIVITY 4-27 (WORKSHEET 4-9)

For each question  
in Activity 4-27,  
circle the letter  
each student marked.

		FOLLOWING DIRECTIONS PAGE																			
		Following Directions										Comic Boo									
		Teacher Rating					Score					1									
		0	1	2	3	4	5	YES	PART	NO	A	B	C	D							
KEY	STUDENT NUMBER	1.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		2.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		3.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		4.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		5.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		6.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		7.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		8.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		9.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		10.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		11.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		12.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		13.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		14.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		15.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		16.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		17.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		18.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		19.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						
		20.	0	1	2	3	4	5	YES	PART	NO	A	B	C	D						

GROUP TOTALS

Does this review give an accurate indica

If not, what other evidence do you have

TALLYSHEET 4-6  
ACTIVITY 4-27 (WORKSHEET 4-9)

FOLLOWING DIRECTIONS PAGE			CONCEPTS PAGE			
Following Directions			Comic Book	Garbage Problem	Microbes	Recycling
Teacher Rating		Score	1	2	3	4
KEY	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
1.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
2.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
3.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
4.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
5.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
6.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
7.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
8.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
9.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
10.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
11.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
12.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
13.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
14.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
15.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
16.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
17.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
18.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
19.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D
20.	0 1 2 3 4 5	YES PART NO	A B C D	A B C D E F G	A B C D	A B C D

ALS

Does this review give an accurate indication of student understanding?

☐ YES☐ NO

If not, what other evidence do you have of student learning?

TALLYSHEET 4-7  
ACTIVITY 4-27 (WORKSHEET 4-10)

Category 1: Circle YES for each student who included a recycling use. Otherwise, circle NO.

Category 2: Circle the appropriate word to indicate whether each student finished the story completion task.

Category 3: Circle the appropriate word to indicate the medium each student used. If you circle OTHER, specify the medium used.

Interpretation and Recording in the Student Record of Progress:

This activity assesses the student's understanding of the concept of recycling and his reasoning ability in completing a story. Students who did not include a recycling use will need many additional experiences in completing stories in addition to extended experience with the concept of recycling.

Find the column marked Activity 4-27, Recycling Use, on the Concepts Page of the Student Record of Progress. Circle YES if the student included a recycling use. Otherwise, circle NO.

STUDENT NUMBER

KEY

CONCEPTS PAGE			
Category 1		Category 2	
Recycling Use		Completion	
YES	NO	FINISHED	INCOMPLETE
1.	YES NO	FINISHED	INCOMPLETE
2.	YES NO	FINISHED	INCOMPLETE
3.	YES NO	FINISHED	INCOMPLETE
4.	YES NO	FINISHED	INCOMPLETE
5.	YES NO	FINISHED	INCOMPLETE
6.	YES NO	FINISHED	INCOMPLETE
7.	YES NO	FINISHED	INCOMPLETE
8.	YES NO	FINISHED	INCOMPLETE
9.	YES NO	FINISHED	INCOMPLETE
10.	YES NO	FINISHED	INCOMPLETE
11.	YES NO	FINISHED	INCOMPLETE
12.	YES NO	FINISHED	INCOMPLETE
13.	YES NO	FINISHED	INCOMPLETE
14.	YES NO	FINISHED	INCOMPLETE
15.	YES NO	FINISHED	INCOMPLETE
16.	YES NO	FINISHED	INCOMPLETE
17.	YES NO	FINISHED	INCOMPLETE
18.	YES NO	FINISHED	INCOMPLETE
19.	YES NO	FINISHED	INCOMPLETE
20.	YES NO	FINISHED	INCOMPLETE

GROUP TOTALS

Does this review give an accurate picture?

If not, what other evidence do you have?



TALLYSHEET 4-7  
ACTIVITY 4-27 (WORKSHEET 4-10)

Teacher \_\_\_\_\_

CONCEPTS PAGE							
Category 1		Category 2		Category 3			
Recycling Use		Completion		Medium Used			
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	(SPECIFY)
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
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YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE	OTHER	
YES	NO	FINISHED	INCOMPLETE	WRITTEN	TAPE		

GROUP TOTALS \_\_\_\_\_

Does this review give an accurate indication of student understanding? ☐ YES ☐ NO

If not, what other evidence do you have of student learning?

TALLYSHEET 4-8  
ACTIVITY 4-28 (WORKSHEETS 4-11, 4-12, 4-13, and 4-14)

Instructions for scoring Worksheets 4-11, 4-12, 4-13, and 4-14, and for interpreting results are given in Activity 4-28.

		CONCEPTS PAGE														
		Compost					Food Chains			Long Journey		Food Web		Inter		
		1					2			3		4				
		0	1	2	3	4	5	SNAKE	GRASS	OTHER	YES	NO	YES	NO	A	
STUDENT NUMBER	KEY	0	1	2	3	4	5	SNAKE	GRASS	OTHER	YES	NO	YES	NO	A	
	1.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	2.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	3.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	4.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	5.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	6.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	7.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	8.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	9.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	10.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	11.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	12.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	13.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	14.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	15.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	16.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	17.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	18.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
	19.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A	
20.	0	1	2	3	4	5	SNAKE	GRASS	_____	YES	NO	YES	NO	A		
GROUP TOTALS		—	—	—	—	—	—	—	—	—	—	—	—	—	—	

## TALLYSHEET 4-8

IVITY 4-28 (WORKSHEETS 4-11, 4-12, 4-13, and 4-14)

[illegible]

		CONCEPTS PAGE																
		Things That Breathe		Wet and Dry		Cool and Warm		Baking Bread		Food Cycles		Garbage						
		8		9		10		11		12		13						
KEY		YES	NO	YES	NO	YES	NO	<u>A</u>	B	C	D	YES	NO	A	<u>B</u>	<u>C</u>	D	E
STUDENT NUMBER																		
1.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
2.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
3.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
4.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
5.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
6.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
7.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
8.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
9.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
10.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
11.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
12.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
13.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
14.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
15.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
16.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
17.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
18.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
19.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E
20.		YES	NO	YES	NO	YES	NO	A	B	C	D	YES	NO	A	B	C	D	E

GROUP TOTALS \_\_\_\_\_

Does this review give an accurate indication of student understanding?

If not, what other evidence do you have of student learning?

[illegible]

an accurate indication of student understanding?

☐ YES☐ NO

ERIC do you have of student learning?



## Me and my Environment

### UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

#### UNIT IV OVERVIEW

The focus of Unit IV is on the interdependency that exists between man and his environment, and the degree to which man is capable of affecting the quality of his environment. Related activities treat sequentially the flow of energy through living things, the cyclical nature of materials, man's place in the recycling of resources, and how man can facilitate the natural cyclic system maintained by the environment.

The first core of activities attempts to develop the concept of transferring energy and matter through environmental systems (food chains, food webs). Its intent is to create a foundation or frame of reference for the student so he can relate later concepts to the finite quantity of his environmental resources.

The second core of activities concentrates on those concepts required for the student to understand the processes of decomposition as they occur in nature and as they can be affected by man's contribution to the environmental system. How can man act to facilitate or inhibit the decomposition processes?

The third core of activities is directed toward illuminating the effects that man can have on his environment through the materials that are made by him, used by him, and eventually disposed of by him. Concepts are developed to depict the importance of managing man's waste. Emphasis is placed on understanding the decomposition of non-biodegradable and biodegradable materials, and how these are related to the need to recycle certain components of the environment.

John Muir once said we find it hitched to ev

The earth is finite we run out of most of th

Unit IV attempts to ment of interactions and along food chains is rec into more complex food w environment like energy. continually cycled, or r relationships is the lar ing of decomposers. Wit community would soon cea on the role (both helpfu environment. Ways are s environment through comp contributes to the devel practice in inquiry and for the student new aven

## UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT



**BSCS**

### UNIT IV RATIONALE

John Muir once said, "When we try to pick out anything by itself, we find it hitched to everything else in the universe."

The earth is finite in size and material resources. Why then don't we run out of most of these resources?

Unit IV attempts to answer the question and to amplify the statement of interactions and interdependencies. The transfer of food energy along food chains is reconsidered, and the interlocking of these chains into more complex food webs is elaborated. Materials flow through the environment like energy. In contrast to energy, however, materials are continually cycled, or reused. A significant agent in all these cycling relationships is the large group of organisms classified under the heading of decomposers. Without the decomposers, cycling through the living community would soon cease to exist. Thus, a primary emphasis is placed on the role (both helpful and harmful) of decomposer organisms in the environment. Ways are suggested whereby the student can act on his environment through composting and other such activities. The unit contributes to the development of a success syndrome through continued practice in inquiry and problem-solving skills. It attempts to open up for the student new avenues of interest in the world around him.



## Me and my Environment

### UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

#### CORE A. THE FOOD CHAIN GAME REVISITED

#### AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

1. Develop an understanding
2. Develop an understanding relationship of the mate
3. Recognize the role of de
4. Realize that because cer to which man uses these
5. Comprehend the role of m nature.

1. Reconstruct the transfer systems.
2. Recognize the existence plants and animals as a



UNIT IV. TRANSFER AND CYCLING OF  
MATERIALS IN MY ENVIRONMENT

CORE A. THE FOOD CHAIN GAME REVISITED



BSCS

UNIT IV GOALS

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

CORE A OBJECTIVES

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.



## Me and my Environment

### UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

#### CORE A. THE FOOD CHAIN GAME REVISITED

##### CORE A RATIONALE

Organisms interact with each other, and with the environment, in a variety of ways. Life is entirely dependent upon these interactions. The influences of one life form upon another are often very subtle, but man and his ability to succeed as a life form are controlled by these interactions. Because of man's ability to alter the environment, and because of his tendency to make a more dramatic impact on it, what may appear to be a simple, straightforward action can have a major, long-range impact on the very interactions man is dependent on. It is important for students to understand this concept. This core lays a foundation for a more thorough treatment of it later on in Unit V by reviewing energy flow and materials cycling in man's environment.

##### BACKGR

A food chain is a series of other. One living thing gets its life-sustaining energy by still another living thing gets its life-sustaining energy chain. All chains start with the green plant. This plant provides food for all other organisms by producing starch compounds. It is these elements and substances that move through the living world to manufacture food. The energy now stored temporarily in the plant is then passed on to the person who eats the plant or other organism for food. The movement directly from plants, and animals supply the chain is connected to man. The food chain cannot be viewed as a static and interconnecting relationship and energy is presented

## UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

### CORE A. THE FOOD CHAIN GAME REVISITED



**BSCS**

#### BACKGROUND INFORMATION FOR THE TEACHER

environment, in a  
interactions.  
very subtle, but  
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pn. It is  
s core lays a  
in Unit V by  
vironment.


A food chain is a series of organisms that interact by eating each other. One living thing is eaten by another, which in turn is utilized by still another living thing for food, and so forth. Each living thing gets its life-sustaining energy from the one previous to it in the chain. All chains start (or end, depending upon your viewpoint) with the green plant. This most fundamental cog of life produces food for all other organisms by locking the sun's energy into usable sugar and starch compounds. It is the plant that originally has drawn waterborne elements and substances from the soil and started them on their odyssey through the living world. A growing corn plant uses the sun's energy to manufacture food. The energy which originally came from the sun is now stored temporarily in a kernel of corn. The energy and food material is then passed on to the chicken that eats the corn, and then on to the person who eats the chicken. But few organisms depend solely upon one other organism for food. Man acquires material for growth and energy for movement directly from plants, as well as from other animals. These plants, and animals supply food to other organisms as well. One food chain is connected to many others; hence the interdependency and transfer cannot be viewed as a straight line, but must be seen as a highly complex and interconnecting relationship. Thus it is that the flow of materials and energy is presented in the context of the food web.



# Me and my Environment

## UNIT IV. CORE A.

## PLANNING GUIDE


NOTE: Some activities (indicated in *italics* and an  in the margin) be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies needed.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
<p>4-0. Making Compost</p> <p>Days needed: 1</p>	<p>35 mm Slide projector</p> <p>Bottle caps</p> <p>4 Plastic bags</p> <p>Pieces of glass</p> <p>Pieces of plastic</p> <p>Potting soil or peat moss</p> <p>Soil from lawn or garden</p> <p>Organic matter</p> <p>Large spoon to stir compost</p>	<p>Equal-arm balance</p> <p>Slide 4-0</p> <p>Worksheet 4-0</p> <p>4 Plastic sweater boxes with lids</p>	<p>One</p> <p>Any soft drink</p> <p>Sandwich bag</p> <p>Approximate</p> <p>Approximate</p> <p>bleach, and</p> <p>Enough to fill</p> <p>Enough to fill</p> <p>Dried leaves</p> <p>grapefruit</p> <p>Four</p> <p>Worksheet 4-0</p> <p>Compost pile</p> <p>10 X 14 X 5</p>

# PLANNING GUIDE



## BSCS

activities (indicated in italics and an  in the margin) must be ordered several days or weeks in advance. Use this summary as a guide for planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher ( <i>Italics and Arrow Indicate Advance Preparation Directions</i> )
Materials in Supply Kit	
Equal-arm balance	One
	Any soft drink bottle caps, need at least four
	Sandwich bags
	Approximately 2 X 2 inches, from any glass source
	Approximately 2 X 2 inches, from plastic bottles such as bleach, ammonia, etc.
	Enough to fill the two sweater boxes
	Enough to fill the two sweater boxes
	Dried leaves, grass clippings, potato peelings, orange and grapefruit rinds, pieces of carrots, apples, bananas, etc.
	Four
Slide 4-0	Worksheet 4-0
Worksheet 4-0	Compost pile daily record
4 Plastic sweater boxes with lids	10 X 14 X 5 inches, four per class



# Me and my Environment

## UNIT IV. CORE A.

## PLANNING GUIDE


NOTE: Some activities (indicated in italics and an arrow) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Italics)
	Materials You Furnish	Materials in Supply Kit	
4-1. The Food Chain Game Revisited  Days needed: 2	35 mm Slide projector	Plant and animal flash cards Food Chain Game cards Slide 4-1 Worksheet 4-1 Slide 4-2	Two decks Four decks Chain-link Missing Worksheet
4-2. Journey through a Food Chain  Days needed: 1-2	35 mm Slide projector	Flash cards: Hawk Cow Mosquito Snake Man Grass Frog Energy symbol card Food symbol card Water symbol card Worksheet 4-2 Slide 4-3	Order file (See Appendix)  One per class One per class One per class Clues to Worksheet
4-3. The Long Journey  Days needed: 1		Booklet, <i>The Long Journey</i>	One per class

# PLANNING GUIDE



**BSCS**

activities (indicated in *italics* and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a teaching and preparation schedule. All supplies needed are listed.

## of Supplies Needed

### Notes and Suggestions to Teacher

(*Italics* and *Arrow* Indicate Advance Preparation Directions)

#### Materials in Supply Kit

Plant and animal flash cards  
Food Chain Game cards  
Slide 4-1  
Worksheet 4-1  
Slide 4-2

Two decks per class  
Four decks per class  
Chain-link pictures of animals  
Missing links  
Worksheet 4-1, Missing links

#### Flash cards:

Hawk  
Cow  
Mosquito  
Snake  
Man  
Grass  
Frog

Energy symbol card  
Food symbol card  
Water symbol card  
Worksheet 4-2  
Slide 4-3

*Order film, Garbage, for Activity 4-20.  
(See Activity for details.)*

One per class  
One per class  
One per class  
Clues to Success - Food Chain  
Worksheet 4-2, Clues to Success - Food Chain

Booklet, *The Long Journey*

One per student



# Me and my Environment

## UNIT IV. CORE A.

## PLANNING GUIDE

NOTE: Some activities (indicated in *italics* and an in the margin) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies in


Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
4-4. Food Webs  Days needed: 1	Yarn Scissors Masking tape	Food Chain Game flash cards	Six to eight One pair per One roll, H One deck per
4-5. Food Webs in My Community  Days needed: 3	Clipboard 3 X 5 inch cards Yarn, string or masking tape	Tallysheet 4-2	For teacher  For teacher
4-6. Food Webs in Other Places  Days needed: 1	35 mm Slide projector	Slide 4-4 Slide 4-5 Slide 4-6 Slide 4-7 Slide 4-8 Slide 4-9	Fish in pond Alligator in Elk in mount Buffalo on c Constrictor Lion on velo
4-7. Clues to Success  Days needed: 2	35 mm Slide projector Many magazines with plant and animal pictures Scissors Butcher paper Large felt pens or crayons Paste or tape	Worksheet 4-3	<i>Collect maga</i> One pair per One piece pe One per stud Some for eac Review of Su



# PLANNING GUIDE



BSCS

Activities (indicated in italics and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a guide and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
Food Chain Game flash cards	Six to eight balls of different colors, one color per team One pair per team (include some left-handed ones) One roll, Hook Velcro may also be used One deck per class
Tallysheet 4-2	For teacher use  For teacher use
Slide 4-4 Slide 4-5 Slide 4-6 Slide 4-7 Slide 4-8 Slide 4-9	Fish in pond Alligator in Everglades Elk in mountain meadow Buffalo on grassland Constrictor in desert Lion on veldt
Worksheet 4-3	<i>Collect magazines well in advance, several for each student</i> One pair per student One piece per student One per student Some for each student Review of Success



## Me and my Environment

### UNIT IV. CORE A.

## PLANNING GUIDE


NOTE: Some activities *(indicated in italics and an arrow)* be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Ita
	Materials You Furnish	Materials in Supply Kit	
4-7. Clues to Success (continued)		Slide 4-10 Slide 4-11 Slide 4-12 Slide 4-13	Question Question Question Question

# PLANNING GUIDE



**BSCS**

activities (indicated in *italics* and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a teaching and preparation schedule. All supplies needed are listed.

of Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
Slide 4-10 Slide 4-11 Slide 4-12 Slide 4-13	Question 1, Clues to Success Question 2, Clues to Success Question 3, Clues to Success Question 4, Clues to Success



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### INQUIRY SKILLS:

Observing, Describing, Comparing, Speculating

#### PROBLEM-SOLVING SKILLS:

Experimenting, Recording Data

#### PRACTICAL APPLICATION:

Learning Gardening Skills, Practice in Writing Skills, Following Directions, Value of Natural Fertilizers

### Activity 4-0. Making Compost

*In this activity students will set up compost piles that will be used in later activities (4-10, 4-11, and 4-12) to demonstrate decomposition by microbes. Since the decomposition is a relatively slow process, the compost piles must be started at the beginning of the unit, so they will be ready to use as fertilized soil by Activity 4-11.*

#### Teacher Preparation:

1. This activity involves setting up compost piles, watching them for several weeks, and recording changes in the compost. It will be necessary to take time at the beginning of your class period every week or so to observe the compost piles.
2. Collect the necessary materials and have them on a table in the classroom.

Plastic sweater boxes with lids,  
4 approximately 10 X 14 X 5  
inches

Worksheet 4-0

Slide 4-0

Wire, 6 inches long

Equal-arm balance

\*Bottle caps, 4

\*Plastic sandwich bags, 4

(continued on next page)

\*Not furnished in materials kit

## ACTIVITY

ILLS:  
ing, Describing, Comparing, Speculating

IVING SKILLS:  
menting, Recording Data

PLICATION:  
g Gardening Skills, Practice in  
Skills, Following Directions,  
of Natural Fertilizers

### Making Compost

Students will set up compost piles that  
later activities (4-10, 4-11, and 4-12)  
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the compost. It will be necessary to  
t the beginning of your class period  
or so to observe the compost piles.

necessary materials and have them on  
the classroom.

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT



BSCS

### ACTIVITY 4-0. MAKING COMPOST

*During this activity, each student should:*

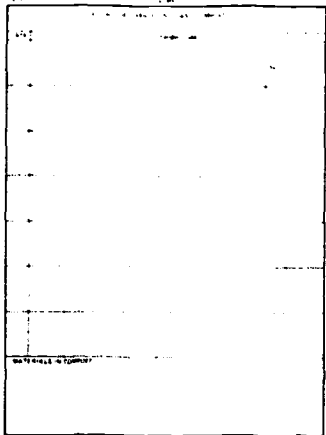
- participate in setting up a compost pile*
- speculate what will happen to the garbage in the compost pile*
- observe and record changes in the compost pile.*

ACTIVITY  
4-0

MATERIALS

- \*Pieces of plastic approximately  
2 X 2 inches
- \*Pieces of glass approximately  
2 X 2 inches
- \*Other items of students' choice
- \*Potting soil or peat moss
- \*Soil from lawn or garden
- \*Organic matter such as:
  - Potato peelings
  - Leaves
  - Orange and grapefruit rinds
  - Grass clippings
  - Coffee grounds
  - Pieces of apple, banana,  
carrots, etc.
- \*35 mm Slide projector
- \*4 Large spoons

Worksheet 4-0



\*Not furnished in materials kit

TEACHING STRATEGIES

Begin by saying:

TODAY WE ARE GOING TO BEGIN AN EXPERIMENT TO  
FIND OUT WHAT HAPPENS TO GARBAGE.

WHAT WOULD HAPPEN TO YOUR GARBAGE IF IT WAS  
JUST LEFT IN THE YARD AND NOT COLLECTED?

WHERE WOULD YOU PUT SOMETHING IF YOU WANTED  
IT TO ROT QUICKLY?

THINGS CAN ROT IN SOIL. WHY DO YOU SUPPOSE  
SOIL MIGHT BE A GOOD PLACE FOR THINGS TO ROT?

Now introduce the term "compost." Write the term on the  
chalkboard. Explain that a compost pile is where  
gardeners put grass clippings and similar plant garbage  
to rot.

Distribute Worksheet 4-0 to each student. Have students  
name each item that is to be added to the compost piles  
(sweater boxes), along with a brief description of its  
present condition, and list these on the chalkboard.  
When the list is complete, have each student copy it in  
the space at the bottom of the worksheet.

Use soil from your area in three of the boxes. Potting  
soil could be used in the fourth box as a comparison.  
Set up the compost piles in the manner illustrated in  
Diagram 4-0.

1. Place about one-half inch of soil in each sweater  
box.

## TEACHING STRATEGIES

ng:

ARE GOING TO BEGIN AN EXPERIMENT TO  
WHAT HAPPENS TO GARBAGE.

LD HAPPEN TO YOUR GARBAGE IF IT WAS  
T IN THE YARD AND NOT COLLECTED?

ULD YOU PUT SOMETHING IF YOU WANTED  
T QUICKLY?

AN ROT IN SOIL. WHY DO YOU SUPPOSE  
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grass clippings and similar plant garbage

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used in the fourth box as a comparison.  
mpost piles in the manner illustrated in

out one-half inch of soil in each sweater

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Rot," "Get smelly," "Go icky," "Pile  
up," etc.

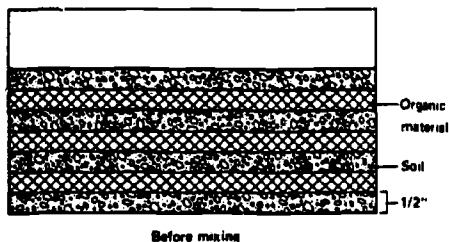
--guess, "In the ground," "Bury it," "Don't know."

--speculate on why soil would be a good place for  
things to rot and give possible explanations such  
as, "Worms live there," "It's dirty," "It's  
damp," etc.

## MATERIALS

Diagram 4-0

Plastic sweater box



Before mixing



After mixing

## TEACHING STRATEGIES

2. Add a layer of organic matter on top of the soil. The organic layer should consist of such things as fruit peelings, grass and leaves, potato peelings, etc. Avoid adding large pieces since they will take longer to decompose. Odor will be minimized if the organic matter added consists primarily of vegetable remains, avoiding animal proteins as much as possible. The compost still will get smelly!
3. Add another one-half inch layer of soil.
4. Continue this pattern until the boxes are about two-thirds full. Be sure that the boxes contain about half soil and half organic matter.
5. In the various layers of organic matter, have students place the bottle cap, plastic bag, piece of plastic, piece of glass, bits of paper, and other similar items students wish to bring to class.

Divide the class into four teams and proceed to set up the compost piles. Work slowly, explaining what to do at each step. As each item is put in the box, help focus attention by asking questions such as:

WHAT COLOR IS (item)?

HOW DOES THE (item) FEEL?

HOW DOES THE (item) SMELL?

Have at least one student weigh a piece of organic matter (orange peel) which will likely undergo decomposition, and an object (glass) which will not. Use the balance and weighing techniques first learned in Unit I to weigh a piece of orange peel about the size of a fifty-cent piece.



## TEACHING STRATEGIES

of organic matter on top of the soil. layer should consist of such things as twigs, grass and leaves, potato peels, etc. Avoid adding large pieces since they will take longer to decompose. Odor will be reduced if the organic matter added consists of vegetable remains, avoiding animal remains as much as possible. The compost still smells good!

one-half inch layer of soil.

Repeat this pattern until the boxes are about full. Be sure that the boxes contain one-half soil and half organic matter.

For each layer of organic matter, have students place the bottle cap, plastic bag, plastic, piece of glass, bits of wood, or other similar items students wish to use in the class.

Divide the class into four teams and proceed to set up the boxes. Work slowly, explaining what to do with each item as it is put in the box, help students by asking questions such as:

(item)?

(item) FEEL?

(item) SMELL?

Have each student weigh a piece of organic matter (1) which will likely undergo decay and an object (glass) which will not. Demonstrate weighing techniques first learned in class. Weigh a piece of orange peel about the

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-0

Students should:

--respond appropriately.

--respond appropriately.

--respond appropriately.

**MATERIALS**

**TEACHING STRATEGIES**

Attach a piece of wire to the peel so the wire sticks out of the compost to mark the peel's location. Similarly, weigh and attach a wire to a piece of (glass). Record the initial weights. Reweigh them every few weeks and compare any changes in weight.

When all the contents have been added and mixed well, sprinkle enough water into the mixture to make the contents damp, but not muddy. Continue to add moisture to the boxes as needed periodically. After the contents are in the boxes, place a lid on each box and store them in a dark, warm place in your room. You can store the boxes in another place if they are too offensive for your room. If you live in a warm area, they can be stored and/or opened out-of-doors. Use your discretion here.

To terminate this set-up portion of the activity, ask students to make some predictions about what is going to happen by asking:

DO YOU SUPPOSE THIS PILE OF STUFF IS GOING TO CHANGE? HOW?

WHAT DO YOU THINK WILL HAPPEN TO THE (item)?

Repeat this question for all the objects you have placed in the compost pile.

## TEACHING STRATEGIES

...e of wire to the peel so the wire sticks  
...mpost to mark the peel's location.  
...igh and attach a wire to a piece of  
...ord the initial weights. Reweigh them  
...ks and compare any changes in weight.

...contents have been added and mixed well,  
...gh water into the mixture to make the  
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...as needed periodically. After the contents  
...kes, place a lid on each box and store  
...k, warm place in your room. You can store  
...another place if they are too offensive for  
...f you live in a warm area, they can be  
...opened out-of-doors. Use your discretion

...this set-up portion of the activity, ask  
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...ing:

...UPPOSE THIS PILE OF STUFF IS GOING TO  
...HOW?

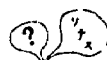
...YOU THINK WILL HAPPEN TO THE (item)?

...question for all the objects you have  
...compost pile.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

- make their predictions of expected changes in the compost.
- make their predictions of expected changes in a specific item.
- make predictions for all the objects in the compost piles.

  
**ACCEPT ALL  
ANSWERS**

## MATERIALS

## TEACHING STRATEGIES

Attach a piece of wire to the peel so the wire sticks out of the compost to mark the peel's location. Similarly, weigh and attach a wire to a piece of (glass). Record the initial weights. Reweigh them every few weeks and compare any changes in weight.

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Repeat this question for all the objects you have placed in the compost pile.

## TEACHING STRATEGIES

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if you live in a warm area, they can be  
opened out-of-doors. Use your discretion

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SUPPOSE THIS PILE OF STUFF IS GOING TO  
HOW?

YOU THINK WILL HAPPEN TO THE (item)?

question for all the objects you have  
compost pile.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

- make their predictions of expected changes in the compost.
- make their predictions of expected changes in a specific item.
- make predictions for all the objects in the compost piles.

  
**ACCEPT ALL  
ANSWERS**

## MATERIALS

Slide 4-0

## TEACHING STRATEGIES

Project Slide 4-0 (Worksheet 4-0) and explain how the worksheet will be used to record any changes in the compost from day to day. Take about five minutes at the beginning of your class period once every week to stir up the compost and allow students to observe it. They should observe changes in color, texture, size, and odor of all the things added to the soil. Assist students in finding words to describe what they see, but do not tell them what is happening. Help them to express their observations by writing on the chalkboard the descriptive terms they suggest or others they may need. Keep the list brief and concise, eliminating similar or inappropriate terms. Once the description for that day has been agreed on, have the students copy the description on their worksheets.

Certain components in the compost piles will change noticeably between observations, and others will change very little. Individual pieces of organic material will eventually lose their identity. These changes will be noted and discussed further by students in Activities 4-10, 4-11, and 4-12. Over the observation period, work with your students' ability to observe, remember, compare, and record their findings.

## ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student should, as a minimum:*

- have participated in making a compost pile*
- have written weekly observations of the compost on Worksheet 4-0.*

## TEACHING STRATEGIES

(Worksheet 4-0) and explain how the used to record any changes in the to day. Take about five minutes at your class period once every week to st and allow students to observe it. ve changes in color, texture, size, he things added to the soil. Assist ng words to describe what they see, hem what is happening. Help them to ervations by writing on the chalkboard erms they suggest or others they may ist brief and concise, eliminating ppropriate terms. Once the description een agreed on, have the students copy n their worksheets.

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Activity name suggested by class: \_\_\_\_\_

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_\_ Tally \_\_\_\_\_ Rev \_\_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value needs to be improved



Do students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

### Specific Questions:

12. What were students' reactions to making a compost pile? Comment:

13. Did any students have difficulty weighing the orange peel and piece of glass?  
☐ Yes ☐ No Explain:

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Flow of Energy

#### INQUIRY SKILLS:

Identifying, Associating

#### PROBLEM-SOLVING SKILLS:

Discussion and Treatment of Group Data,  
Explaining, Defending, Answering Why Questions

#### PRACTICAL APPLICATION:

Working in Groups, Following Directions

## CTIVITY

### Goals for the Student:

- Develop an understanding of the flow of energy through the living world.
- Comprehend the role of man as an integral part of nature not apart from nature.

### Objectives for the Student:

- Reconstruct the transfer of energy, food, and water through environmental systems.
- Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

### AL THEME:

Relationships of Environmental Components, Energy

### LS:

ying, Associating

### ING SKILLS:

ion and Treatment of Group Data, ing, Defending, Answering Why Questions

### PLICATION:

in Groups, Following Directions

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE A.

ENERGY AND  
MATERIAL TRANSFER

## ACTIVITY 4-1.

THE FOOD CHAIN  
GAME REVISITED



BSCS

ACTIVITY  
4-1

MATERIALS

2 Decks of plant and animal  
flash cards  
4 Decks of Food Chain Game  
cards  
Worksheet 4-1  
Slide 4-1  
Slide 4-2  
\*35 mm Slide projector

TEACHING STRATEGIES

Activity 4-1. The Food Chain Game Revisited

*This activity will give the students an opportunity to review the concepts associated with building food chains. Students will build food chains and trace energy flow along the chain. Emphasis will be placed on the concept that all food for animals (including man) comes from plants.*

Teacher Preparation:

1. Have available ample table space for four groups to play the card game.
2. This activity, because of its length, is divided into Part I and Part II. The first part introduces the concept of food chains, stressing that they end in a plant. The second part of the activity consists of a game that gives the students an opportunity to build food chains.

Some students may remember this game from their experience with it in Unit III. Capitalize on the awareness of such students by placing one of them in each group of students taking part in this activity. They may act as catalysts in initiating discussion. Ask the experienced students, also, to teach new students.

Part I.

Hold up the deck of flash cards and say:

HOW MANY OF YOU REMEMBER PLAYING THIS SCIENCE  
GAME?

WHAT DID WE LEARN FROM THE GAME?

is furnished in materials kit

## TEACHING STRATEGIES

### The Food Chain Game Revisited

will give the students an opportunity to concepts associated with building food chains. Students will build food chains and trace along the chain. Emphasis will be placed on that all food for animals (including from plants.

#### Preparation:

available ample table space for four groups for the card game.

activity, because of its length, is divided into Part I and Part II. The first part introduces the concept of food chains, stressing that food starts in a plant. The second part of the activity consists of a game that gives the students an opportunity to build food chains.

Students may remember this game from their experience in Unit III. Capitalize on the awareness of students by placing one of them in each group to take part in this activity. They may assist in initiating discussion. Ask the students, also, to teach new students.

Check off flash cards and say:

DO YOU REMEMBER PLAYING THIS SCIENCE

WE LEARN FROM THE GAME?

## ANTICIPATED STUDENT BEHAVIORS

*During this activity, each student should:*

- successfully play the Food Chain Game
- defend a food chain sequence
- complete Worksheet 4-1.

Students should:

--indicate whether or not they recall the game.

--recall the game and respond:

"We learned what a food chain is."

"A food chain is some animals that eat other animals."

"All food in a food chain starts with plants."

"We learned who ate who."

## MATERIALS

## TEACHING STRATEGIES

To reinforce this idea, continue by saying:

ONE THING WE DID IN THIS GAME WAS DECIDE WHAT ANIMALS EAT.

(Student's name), FIND THE CARD THAT PICTURES A HAWK.

Select a student to fasten the card to the chalkboard with tape, or set the card on the left side of the chalk tray.

(Student's name), FIND A CARD THAT PICTURES WHAT THE HAWK MIGHT EAT.

Say:

HAWKS EAT \_\_\_\_\_ AND OTHER THINGS.

Have the student fasten or set up the picture to the right of the hawk.

(Student's name), DRAW AN ARROW FROM THE HAWK TO THE \_\_\_\_\_ TO SHOW THAT A HAWK EATS A \_\_\_\_\_.

Continue to build a food chain by saying:

NOW WHAT DO YOU THINK (prey) EAT?

The hawk, since it eats another animal, is called a predator. Any animal eaten by another is referred to as the prey. Do not expect students to use these terms if they are not familiar with them.



## TEACHING STRATEGIES

idea, continue by saying:

DID IN THIS GAME WAS DECIDE WHAT

ame), FIND THE CARD THAT PICTURES

to fasten the card to the chalkboard  
the card on the left side of the chalk

ame), FIND A CARD THAT PICTURES  
K MIGHT EAT.

AND OTHER THINGS.

fasten or set up the picture to the

ame), DRAW AN ARROW FROM THE HAWK  
TO SHOW THAT A HAWK EATS A

a food chain by saying:

YOU THINK (prey) EAT?

eats another animal, is called a  
mal eaten by another is referred to  
ot expect students to use these  
not familiar with them.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-1

Students should:

--select the hawk card.

--select a card depicting a frog, snake, chicken,  
mouse, rabbit, or bird.

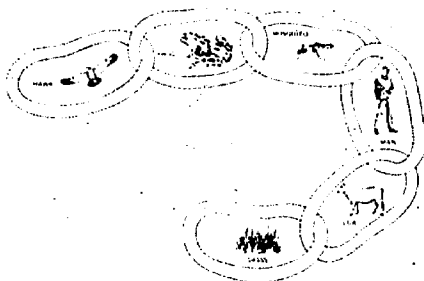
--draw an arrow pointing from the hawk to the prey.

--select appropriate food of the prey, place it  
to the right of the first two cards, and draw  
an arrow between the two.

ACTIVITY  
4-1

MATERIALS

Slide 4-1



TEACHING STRATEGIES

On the back of each flash card is listed the food normally eaten by the animal. Certain animals, of course, may on occasion eat food other than listed. If this issue arises, simply explain that exceptions in the listed eating habits may occur, but for purposes of the game only the listed foods will be used.

Continue until you have completed a logical food chain down to the plant source. Some possible examples follow:

HAWK → SNAKE → MOUSE → GRASSHOPPER → GRASS

HAWK → MOUSE → GRAIN

HAWK → FROG → MOSQUITO → MAN → COW → GRASS

HAWK → SONG BIRD → WORM → LEAF

Project Slide 4-1 and say:

NOTICE THAT WE HAVE SEVERAL ANIMALS THAT EAT OTHER ANIMALS FOR FOOD. SINCE EACH EATS THE ONE NEXT TO IT WE CAN THINK OF THEM AS BEING LINKED TOGETHER.

Point to the hawk and frog and say:

WHY IS THE HAWK LINKED TO THE FROG?

If the desired response is not given, ask:

WHAT DO HAWKS EAT?

Point to the mosquito and say:

WHAT IS THE FROG LINKED TO?

WHY?

## TEACHING STRATEGIES

If each flash card is listed the food eaten by the animal. Certain animals, of an occasion eat food other than listed. If arises, simply explain that exceptions in eating habits may occur, but for purposes only the listed foods will be used.

If you have completed a logical food chain from the plant source. Some possible chains are as follows:

1. SNAKE → MOUSE → GRASSHOPPER → GRASS

2. MOUSE → GRAIN

3. FROG → MOSQUITO → MAN → COW → GRASS

4. SONG BIRD → WORM → LEAF

5. 4-1 and say:

WHAT WE HAVE SEVERAL ANIMALS THAT EAT OTHER ANIMALS FOR FOOD. SINCE EACH EATS THE ANIMAL IT EATS, WE CAN THINK OF THEM AS BEING LINKED TOGETHER.

Now ask the hawk and frog and say:

WHAT IS THE HAWK LINKED TO THE FROG?

If the desired response is not given, ask:

WHAT DO HAWKS EAT?

Now ask the mosquito and say:

WHAT IS THE FROG LINKED TO?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "For food."

--respond, "Frogs," "Snakes," "Mice."

--respond, "Mosquito."

--reply, "Because it likes them," "It eats bugs," "For food."

## MATERIALS

## TEACHING STRATEGIES

Continue in a similar manner on down the food chain to the grass. Then say:

SINCE EACH IS LINKED TO THE NEXT BECAUSE OF WHAT IT EATS, WE CALL THIS A FOOD CHAIN.

Continue by saying:

WHY DO ANIMALS NEED FOOD?

WHY DO YOU NEED FOOD?

WHAT IS STORED IN FOOD THAT HELPS ANIMALS TO DO THINGS AND TO GROW?

If students' responses include such things as sugar or starch, and energy is not mentioned, then ask:

WHAT IS STORED IN THE SUGAR OR STARCH THAT IS NEEDED FOR GROWING AND DOING THINGS?

Point to the chain on Slide 4-1, and say:

LET'S THINK OF ENERGY THAT COMES FROM FOOD. STARTING WITH THE PLANT, TRACE ENERGY ALONG THE FOOD CHAIN.

As the student does the tracing, say:

ENERGY FROM THE GRASS PASSES TO THE COW AS THE COW EATS AND DIGESTS THE GRASS. THE COW USES SOME OF IT TO LIVE AND GROW AND STORES SOME OF IT IN ITS FAT AND MUSCLES. ENERGY PASSES FROM THE COW TO THE MAN AS HE EATS THE

## TEACHING STRATEGIES

similar manner on down the food chain to say:

IS LINKED TO THE NEXT BECAUSE OF  
S, WE CALL THIS A FOOD CHAIN.

g:

ALS NEED FOOD?

NEED FOOD?

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N ITS FAT AND MUSCLES. ENERGY  
THE COW TO THE MAN AS HE EATS THE

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-1

Students should:

--respond, "To grow," "To live," "So they won't be hungry."

--respond, "The same thing," "To grow," "To live."

--recall activities in Unit III and respond, "Energy."

--respond, "Energy."

--point to the plant and then to each succeeding animal in the chain.

HAMBURGER. THEN IT GOES FROM THE MAN TO THE MOSQUITO AS THE MOSQUITO SUCKS BLOOD FROM THE MAN...ETC.

WHERE DID THE HAWK'S ENERGY FIRST COME FROM?

If students have difficulty answering this question, trace the chain in reverse order by saying:

THE HAWK GOT ITS ENERGY FROM THE FROG,  
WHO GOT ITS ENERGY FROM THE MOSQUITO,  
WHO GOT ITS ENERGY FROM THE MAN...ETC.

Build one or two more chains with the entire class. Then divide the class into two groups and distribute one set of flash cards to each group. Have the groups build chains until you feel that the students have fully grasped the idea of the chaining of foods and food energy.

When students are building chains, ask them to begin with man and use the cards to build chains of things he eats. Have them temporarily put the cards on the floor, against the wall, or on a table.

Have the groups display their chains from left to right on the chalk tray. You may wish to encourage competition by asking which group can build the longest chain. Then follow with discussion, questions, and answers.

Say:

THERE ARE MANY FOOD CHAINS WHERE ANIMALS EAT OTHER LIVING THINGS FOR FOOD. THE ANIMAL

## TEACHING STRATEGIES

R. THEN IT GOES FROM THE MAN TO THE  
AS THE MOSQUITO SUCKS BLOOD FROM THE  
C.

D THE HAWK'S ENERGY FIRST COME FROM?

Students have difficulty answering  
question, trace the chain in  
reverse order by saying:

HAWK GOT ITS ENERGY FROM THE FROG,  
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Two more chains with the entire class.  
Divide the class into two groups and distribute  
flash cards to each group. Have the groups  
discuss until you feel that the students have  
the idea of the chaining of foods and

When they are building chains, ask them to begin  
with the cards to build chains of things  
they eat. Then temporarily put the cards on the  
wall, or on a table.

Students display their chains from left to  
right on chalk tray. You may wish to encourage  
asking which group can build the  
longest. Then follow with discussion, questions,

MANY FOOD CHAINS WHERE ANIMALS EAT  
OTHER THINGS FOR FOOD. THE ANIMAL

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--reply, "The grass that the cow ate."

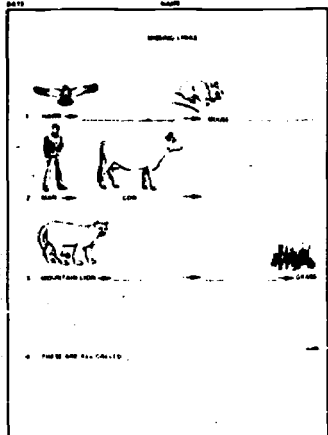
--will build such examples as:

MAN → CHICKEN → GRASSHOPPER → GRASS

MAN → COW → CORN.

## MATERIALS

Slide 4-2, Worksheet 4-1



## TEACHING STRATEGIES

LINKS ARE NOT ALWAYS THE SAME, BUT ALL CHAINS DO HAVE ONE THING THAT IS THE SAME. WHAT IS THE SAME?

If students fail to see that each chain ends with a plant, ask:

LOOK AT THE END OF EACH CHAIN. (Point to the right side.) WHAT IS THE SAME ABOUT EACH OF THESE LIVING THINGS?

Say:

IF WE WERE TO BUILD MORE FOOD CHAINS, WHAT WOULD WE EXPECT TO FIND AT THE END OF THE CHAIN?

Make sure this concept is clear before proceeding.



### Clues to Success:

Place randomly on the chalk tray the following cards, which represent correct responses to the blanks on the worksheet: snake grass grain chicken insect worms.

Distribute Worksheet 4-1 and project Slide 4-2. Point to the cards and the blanks and say:

THESE PICTURES SHOW THE MISSING LINKS ON YOUR WORKSHEET. THE WORDS ON THE CARDS ARE TO BE WRITTEN IN THE BLANK SPACES. SEE IF YOU CAN FILL IN THE BLANKS WITH THE RIGHT WORD.



## TEACHING STRATEGIES

IT ALWAYS THE SAME, BUT ALL CHAINS  
THING THAT IS THE SAME. WHAT IS

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th a plant, ask:

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## CLUES TO SUCCESS



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HE WORDS ON THE CARDS ARE TO BE  
E BLANK SPACES. SEE IF YOU CAN  
LANKS WITH THE RIGHT WORD.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-1

Students should:

--respond, "All begin with an animal," "Linked  
together," "I don't know," "All end in a plant."

--respond, "All are plants."

--recall, "Plants."

WRITE THE NAME OF THE LINK IN THE PROPER SPACE.

WHEN YOU HAVE FILLED IN THE BLANKS IN THE FIRST THREE QUESTIONS, WRITE TWO WORDS IN THE BLANKS TO COMPLETE QUESTION FOUR.

Ask students to put their names on the worksheets and collect them to look at later. Now write the first chain on the chalkboard and ask different students to tell (and defend) what could go in the blanks. Do this for the second and third chains. Remember there are several answers possible for each. Encourage discussion. Praise all good ideas. Return worksheets after results are recorded on Tallysheet 4-1. Save Tallysheet 4-1 for recording the results of Activity 4-2.

After class, review the worksheets and record the results in the Student Record of Progress.

Items 1, 2, and 3 assess the student's understanding of the dependence of living things on each other in a food chain. This understanding includes the concept that all food chains end with plants. In the Understanding Section of the Student Record of Progress, circle YES if all responses are acceptable. Circle NO if any of the food chains are incorrect and give these particular students encouragement and support when they play the Food Chain Game. Additional opportunity is provided in Activity 4-2 for mastering this concept.

## TEACHING STRATEGIES

NAME OF THE LINK IN THE PROPER SPACE.

HAVE FILLED IN THE BLANKS IN THE FIRST QUESTIONS, WRITE TWO WORDS IN THE BLANKS OF QUESTION FOUR.

to put their names on the worksheets and to look at later. Now write the first on the chalkboard and ask different students to complete) what could go in the blanks. Do this for the first and third chains. Remember there are many possibilities for each. Encourage discussion and good ideas. Return worksheets after results on Tallysheet 4-1. Save Tallysheet 4-1 for the results of Activity 4-2.



HAVE YOU  
INVOLVED  
ALL  
STUDENTS?

review the worksheets and record the results on the Student Record of Progress.

and 3 assess the student's understanding of the relationships of living things on each other in a food web. Understanding includes the concept that all life begins with plants. In the Understanding section of the Student Record of Progress, circle YES if the student's answers are acceptable. Circle NO if any of the answers are incorrect and give these particular areas of weakness and support when they play the role of the additional opportunity is provided in reviewing this concept.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--study the choices in the chalk tray and write in an appropriate link in the blanks on the worksheet. Correct answers for each chain are:

1. HAWK → SNAKE → MOUSE → GRASS or GRAIN
2. MAN → COW → GRASS or GRAIN
3. LION → CHICKEN → INSECTS or WORMS → GRASS
4. These are all called FOOD CHAINS.

## MATERIALS



Bird



Spider



Chicken



Hawk



Man



Mountain lion



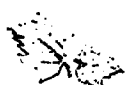
Frog



Snake



Worm



Leaves



Grasses



Grain



Fruits & Berries



Decomposers

## TEACHING STRATEGIES

### Part II. The Next Day.

TODAY WE ARE GOING TO PLAY THE FOOD CHAIN GAME.

Prepare the students to play by dividing the class into groups of three or four. Distribute a deck of Food Chain Game cards to each group. Allow time for them to examine the cards.

Say:

IN THIS GAME WE ARE GOING TO BUILD FOOD CHAINS. YOU WILL DO THIS BY USING THE LIVING THINGS PICTURED ON THE CARDS. THIS GAME IS SIMILAR TO THE RUMMY GAME YOU PLAYED BEFORE. I'LL EXPLAIN THE RULES AS I PLAY THE GAME WITH TWO OF YOU SO YOU WILL KNOW HOW TO PLAY IT.

1. SHUFFLE THE DECK AND DEAL FOUR CARDS TO EACH PLAYER.
2. PLACE THE REST OF THE CARDS FACE DOWN IN THE MIDDLE OF THE TABLE AND TURN THE TOP CARD FACE UP. (Demonstrate.)
3. LOOK AT THE CARDS IN YOUR HAND TO SEE IF ANY OF YOUR CARDS FORM A FOOD CHAIN. (Show your cards to demonstrate.) REMEMBER, CHAINS MUST BE COMPLETE -- THEY MUST BEGIN WITH AN ANIMAL AND END WITH A PLANT.
4. THE PLAYER TO MY LEFT WILL PLAY FIRST. BEFORE YOU LAY ANY CARDS DOWN, DRAW EITHER THE TOP CARD FROM THE FACE-DOWN PILE OR THE TOP CARD FROM THE FACE-UP PILE.

## TEACHING STRATEGIES

xt Day.

E GOING TO PLAY THE FOOD CHAIN GAME.

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three or four. Distribute a deck of  
cards to each group. Allow time for  
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OU LAY ANY CARDS DOWN, DRAW  
THE TOP CARD FROM THE FACE-DOWN  
THE TOP CARD FROM THE FACE-UP

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-1

Students should:

--examine the decks to become acquainted with  
individual cards.

# MATERIALS

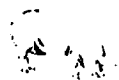
# TEACHING STRATEGIES



Insects



Cow



Pig



Rabbit



Deer



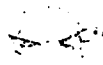
Mouse



Mosquito



Fish



Turtle

5. IF YOU HAVE ONE OR MORE FOOD CHAINS IN YOUR HAND, LAY THE CARDS FACE UP ON THE TABLE IN THE CORRECT ORDER, TELLING WHO EATS WHOM AS YOU DO SO. LAY THE CARDS DOWN SO THEY FORM A CHAIN FROM LEFT TO RIGHT.
6. THEN PICK FROM THE FACE-DOWN PILE THE NUMBER OF CARDS YOU JUST PUT DOWN SO YOU AGAIN HAVE FIVE CARDS, THEN DISCARD ONE. EACH OF YOU WILL HAVE FOUR CARDS AT THE BEGINNING OF YOUR TURN. DRAW ONE SO THAT DURING YOUR TURN YOU HAVE FIVE CARDS, AND DISCARD AT THE END OF YOUR TURN (BACK TO FOUR CARDS).
7. CONTINUE AROUND THE GROUP UNTIL EVERYONE HAS A TURN. CARDS DRAWN ARE USED TO FORM NEW CHAINS OR TO ADD TO OTHERS. (For example: A student may lay down a mouse, insect, and grain as a chain. During a later turn, a snake could be added to the beginning of the chain. A card can also be added to the middle of a chain.)
8. EACH CARD IS WORTH ONE POINT. THE FIRST PERSON TO LAY DOWN ENOUGH CHAINS SO THAT HE HAS AT LEAST TEN POINTS IS THE WINNER. ALL FOOD CHAINS MUST BE COMPLETE AND END WITH A PLANT.

NOTE: If any questions arise about what eats what, make it clear that for purposes of the game the eating habits as described on the large flash cards will be the only ones accepted.

If students encounter difficulty in remembering what each animal normally eats, you may find it helpful to write this information on the chalkboard.

## TEACHING STRATEGIES

YOU HAVE ONE OR MORE FOOD CHAINS IN HAND, LAY THE CARDS FACE UP ON THE TABLE IN THE CORRECT ORDER, TELLING WHO EATS WHOM AS YOU DO SO. LAY THE CARDS SO THEY FORM A CHAIN FROM LEFT TO RIGHT.

PICK FROM THE FACE-DOWN PILE THE FIRST CARD YOU JUST PUT DOWN SO YOU NOW HAVE FIVE CARDS, THEN DISCARD ONE. AT THE END OF YOUR TURN YOU WILL HAVE FOUR CARDS AT THE BEGINNING OF YOUR TURN. DRAW ONE SO THAT AT THE BEGINNING OF YOUR TURN YOU HAVE FIVE CARDS, AND DISCARD ONE AT THE END OF YOUR TURN (BACK TO BACK CARDS).

CONTINUE AROUND THE GROUP UNTIL EVERYONE HAS HAD A TURN. CARDS DRAWN ARE USED TO FORM NEW CHAINS OR TO ADD TO OTHERS. (For Example: A student may lay down a mouse, a snake, and grain as a chain. During a student's turn, a snake could be added to the end of the chain. A card can also be added to the middle of a chain.)

ONE CARD IS WORTH ONE POINT. THE FIRST STUDENT TO LAY DOWN ENOUGH CHAINS SO THAT HE OR SHE HAS AT LEAST TEN POINTS IS THE WINNER. ALL FOOD CHAINS MUST BE COMPLETE AND END WITH A PLANT.

If questions arise about what eats what, make it clear that for purposes of the game the eating habits as described on the large cards will be the only ones accepted.

To counter difficulty in remembering what normally eats what, you may find it helpful to write the information on the chalkboard.

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

### Animal

Bird  
Snake  
etc.

### What He Eats

Grain, Worms, Insects  
Frogs, Mice, Insects, Worms  
etc.



Allow the students to play the game as long as it seems appropriate, assisting when necessary.

Conclude by saying:

WHAT HAVE WE LEARNED FROM PLAYING THIS GAME?

WHY ARE PLANTS IMPORTANT?

WHY ARE ANIMALS IMPORTANT TO EACH OTHER?



## TEACHING STRATEGIES

### What He Eats

Grain, Worms, Insects  
Frogs, Mice, Insects, Worms  
etc.

DEMONSTRATE



to play the game as long as it seems  
lasting when necessary.

g:  
LEARNED FROM PLAYING THIS GAME?

ITS IMPORTANT?

ALS IMPORTANT TO EACH OTHER?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-1

Students should:

--demonstrate ability to play the game following  
the rules described.

--respond, "Animals are important to each other  
and depend on each other," "All animals depend  
on plants."

--conclude, "They are at the end of the food  
chain," "Animals eat them," etc.

--conclude, "Because they eat each other," "They  
get energy from each other," "They wouldn't  
have any food without each other," "They'd  
die." Statements should indicate interdependency  
of living things in terms of food.

*Upon completion of this activity, each student  
should, as a minimum:*

- be able to trace energy through a food chain
- be able to construct a simple food chain
- be able to state that food chains end in plants
- be able to state that animals depend on other  
animals or plants for their food.

ACTIVITY  
4-1

**MATERIALS**

**TEACHING STRATEGIES**

See Change of Pacers 1, 2, and 3.

CHANG

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS



Pacers 1, 2, and 3.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_ Tally \_\_\_\_ Rev \_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST						
MODERATE INTEREST OR INDIFFERENCE						
RESISTANCE OR DISLIKE						

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

Unworthy/Inadequate/Needs the teacher's assistance/Excellent

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the revision suggested ☐ Worth salvaging--make major changes described ☐ Worthless --drop it  
 --keep as is
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment: \_\_\_\_\_

#### Specific Questions:

12. How many students remembered the Food Chain Game from Unit III?  
☐ All ☐ Most ☐ Half ☐ Few ☐ None Comment: \_\_\_\_\_
13. Could most students build a food chain? ☐ Yes ☐ No Comment: \_\_\_\_\_
14. Were any students unable to play Food Chain Game? ☐ No ☐ Yes  
 If yes, who? \_\_\_\_\_

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Complementarity of Organisms and Environment

#### INQUIRY SKILLS:

Identifying, Describing

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task

#### PRACTICAL APPLICATION:

Vocabulary Building, Communication, and  
Following Directions



## ACTIVITY

Goals for the Student:

Develop an understanding of the flow of energy through the living world.

Comprehend the role of man as an integral part of nature not apart from nature.

Objectives for the Student:

Reconstruct the transfer of energy, food, and water through environmental systems.

Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

AL THEME:

Relationships of Environmental Components, Interdependency of Organisms and Environment

LS:

ying, Describing

ING SKILLS:

Question and Task

PLICATION:

ary Building, Communication, and  
ng Directions

UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

CORE A.

ENERGY AND  
MATERIAL TRANSFER

ACTIVITY 4-2.

JOURNEY THROUGH A  
FOOD CHAIN



BSCS

ACTIVITY  
4-2

MATERIALS

Flash cards:

Hawk

Cow

Mosquito

Snake

Man

Grass

Frog

Energy symbol card

Food symbol card

Water symbol card

Slide 4-3

Worksheet 4-2

\*35 mm Slide projector

Energy symbol



\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-2. Journey through a Food Chain

*The preceding activity emphasized the transfer of energy from one organism to another. This activity focuses on the transfer of food material and water, as well as energy, between organisms.*

Teacher Preparation:

Set up in random order on the chalkboard tray the flash cards indicated in the materials column. Ask for a student volunteer to arrange the cards into one food chain that utilizes every card.

Point to the food chain on the chalkboard tray and say:

WHAT WERE WE TALKING ABOUT YESTERDAY THAT MOVED FROM ONE FOOD TO ANOTHER IN A FOOD CHAIN?

ALL FOOD CONTAINS ENERGY.

Hold up the energy symbol and say:

I WILL USE THIS SYMBOL TO REPRESENT THE ENERGY IN FOOD. I'M PLACING THIS SYMBOL FOR ENERGY IN THE GRASS. (Student's name), MOVE THE ENERGY SYMBOL TO WHERE THE ENERGY GOES NEXT IN THIS FOOD CHAIN.

After the student has correctly placed the symbol on the cow, ask:

(Student's name), HOW DOES THE COW GET THE ENERGY?

## TEACHING STRATEGIES

### Journey through a Food Chain

activity emphasized the transfer of energy from one organism to another. This activity focuses on the flow of food material and water, as well as the interactions between organisms.

#### Preparation:

Random order on the chalkboard tray the flash cards placed in the materials column. Ask for a volunteer to arrange the cards into one food chain. Utilizes every card.

Place food chain on the chalkboard tray and say:

ARE WE TALKING ABOUT YESTERDAY THAT MOVED FROM ONE FOOD TO ANOTHER IN A FOOD CHAIN?

IT CONTAINS ENERGY.

Place energy symbol and say:

USE THIS SYMBOL TO REPRESENT THE ENERGY. I'M PLACING THIS SYMBOL FOR ENERGY GRASS. (Student's name), MOVE THE SYMBOL TO WHERE THE ENERGY GOES NEXT IN THE FOOD CHAIN.

When student has correctly placed the symbol on the

(Student's name), HOW DOES THE COW GET THE

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- move energy, water, and food symbols from one component to another in a food chain
- demonstrate an understanding of energy and matter transfer by correctly completing Worksheet 4-2.

Students should:

- arrange the seven cards into the following food chain: Hawk → Snake → Frog → Mosquito → Man  
Cow → Grass.

- recall from Activity 4-1 and respond, "Energy."

- move the energy symbol to the cow.

- reply, "It eats the grass."

INVOLVE YOUR

 SLOWEST  
STUDENTS 

## MATERIALS

Food symbol



## TEACHING STRATEGIES

Continue in the same manner, giving other students the opportunity to move the energy symbol and to answer what the direct energy source is. Proceed until several students have had the chance to move the symbol. Then say:

WE'VE JUST SEEN THAT ENERGY IS PASSED ALONG FROM ONE LIVING THING TO ANOTHER. ARE THERE ANY OTHER THINGS BESIDES ENERGY THAT ARE PASSED ALONG IN A FOOD CHAIN?

If food is given as an answer, ask:

WHAT IS THE FOOD THAT PLANTS MAKE?

If the students do not recall, refer to the activities in Unit III, Core D. Then hold up the food symbol, and say:

I WILL USE THIS SYMBOL TO REPRESENT THE FOOD THAT PLANTS MAKE.

Place the food symbol on the grass.

(Student's name), MOVE THE FOOD SYMBOL TO WHERE IT PASSES AFTER IT LEAVES THE PLANT.

FOOD IS PASSED ALONG. HOW COULD A COW GET FOOD FROM A PLANT?

(Student's name), MOVE THE FOOD SYMBOL TO WHERE THE FOOD WOULD GO NEXT IN THE FOOD CHAIN.

HOW CAN THE MAN GET THE FOOD THAT WAS ONCE A PART OF THE PLANT?

## TEACHING STRATEGIES

same manner, giving other students the chance to move the energy symbol and to answer what the energy source is. Proceed until several students have had the chance to move the symbol. Then

ASK THE STUDENTS IF THEY HAVE SEEN THAT ENERGY IS PASSED ALONG FROM ONE THING TO ANOTHER. ARE THERE ANY OTHER EXAMPLES OF ENERGY THAT ARE PASSED ALONG IN NATURE?

As an answer, ask:

WHAT FOOD DO PLANTS MAKE?

If students do not recall, refer to the activities in Unit III, Core D. Then hold up the food symbol, and say:

USE THIS SYMBOL TO REPRESENT THE FOOD THAT PLANTS MAKE.

Place the symbol on the grass.

(Name), MOVE THE FOOD SYMBOL TO WHERE IT GOES AFTER IT LEAVES THE PLANT.

HOW DOES THE FOOD GET PASSED ALONG. HOW COULD A COW GET FOOD FROM THE PLANT?

(Name), MOVE THE FOOD SYMBOL TO WHERE IT WOULD GO NEXT IN THE FOOD CHAIN.

HOW CAN A MAN GET THE FOOD THAT WAS ONCE A PLANT?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-2

Students should:

--respond, "Food," "Water," "I don't know."

--recall that sugar is the end product of photosynthesis.

--move the food symbol to the cow.

--reply, "Eat the plant."

--inspect the chain and move the food symbol to the man.

--reply, "Eat the cow (hamburger, steak)."

ACTIVITY  
4-2

MATERIALS

Water symbol



TEACHING STRATEGIES

Continue the strategy in a similar manner and again give a variety of students the opportunity to participate. Then set up another chain and say:

FOOD IS NOT THE ONLY MATERIAL THAT IS PASSED FROM ONE LINK TO ANOTHER ALONG A CHAIN. WATER MOVES THROUGH THE CHAIN TOO.

Now hold up the water symbol and say:

WHO WOULD LIKE TO SHOW US HOW THIS WATER SYMBOL WOULD GET FROM ONE END OF THE CHAIN TO THE OTHER?

Let volunteer move the water symbol through the food chain.

Conclude by saying:

WE HAVE LEARNED, THEN, THAT THREE KINDS OF THINGS ARE PASSED FROM ONE PART OF THE FOOD CHAIN TO THE OTHER. NAME THE THREE THINGS.

Write student responses on the chalkboard. Then say:

## TEACHING STRATEGIES

strategy in a similar manner and again give students the opportunity to participate. another chain and say:

NOT THE ONLY MATERIAL THAT IS PASSED  
LINK TO ANOTHER ALONG A CHAIN. WATER  
ROUGH THE CHAIN TOO.



HAVE YOU  
INVOLVED  
ALL  
STUDENTS?

the water symbol and say:

D LIKE TO SHOW US HOW THIS WATER  
OULD GET FROM ONE END OF THE CHAIN  
THER?

move the water symbol through the food

aying:

LEARNED, THEN, THAT THREE KINDS OF  
RE PASSED FROM ONE PART OF THE FOOD  
THE OTHER. NAME THE THREE THINGS.

responses on the chalkboard. Then say:

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--place the water symbol on the plant (at the end of the chain) and move it from link to link. While doing so they should indicate their understanding by making statements similar to, "The water from the corn is transferred to the mouse when it eats the corn, and then on to the snake when the snake eats the mouse, and finally to the hawk when the hawk eats the snake."

--respond, "Energy," "Food," and "Water."

## MATERIALS

## TEACHING STRATEGIES

FOOD CONTAINS MANY THINGS. WHAT WERE SOME OF THE THINGS WE LEARNED ABOUT EARLIER THIS YEAR THAT ARE IN FOOD?

FOOD CONTAINS SUGARS, VITAMINS, MINERALS, AND OTHER BODY-BUILDING MATERIALS.

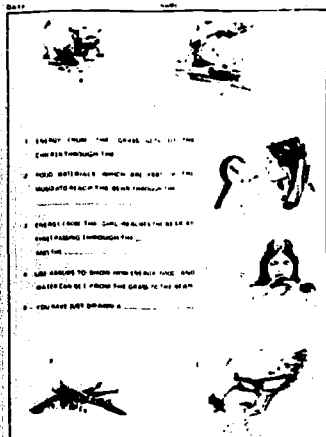
Then say:

WHEN FOOD IS PASSED ALONG A FOOD CHAIN, THEN ALL OF THESE THINGS ARE PASSED, TOO, AS PART OF THE FOOD.

CLUES

TO

### Worksheet 4-2



Distribute Worksheet 4-2. Direct the students' attention to the pictures on the worksheet, and say:

LOOK AT THE PICTURES ON YOUR WORKSHEET.

WHAT IS SHOWN IN A?

WHAT IS SHOWN IN B?

WHAT IS SHOWN IN C?

WHAT IS SHOWN IN D?

WHAT IS SHOWN IN E?

WHAT IS SHOWN IN F?



## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-2

AS MANY THINGS. WHAT WERE SOME OF  
WE LEARNED ABOUT EARLIER THIS YEAR  
FOOD?

AS SUGARS, VITAMINS, MINERALS, AND  
BUILDING MATERIALS.

PASSED ALONG A FOOD CHAIN, THEN  
THINGS ARE PASSED, TOO, AS PART

Students should:

--recall, "Protein," "Vitamins," "Minerals,"  
"Don't know."



heet 4-2. Direct the students' attention  
in the worksheet, and say:

PICTURES ON YOUR WORKSHEET.

N IN A?

N IN B?

N IN C?

N IN D?

N IN E?

N IN F?

--respond, "A bear eating a fish."

--respond, "A fish eating the mosquito."

--respond, "A mosquito biting a girl."

--respond, "A girl eating the chicken leg."

--respond, "A chicken eating the caterpillar."

--respond, "A caterpillar eating the grass."

As students describe each picture have them assist in spelling as you write on the chalkboard:

- A. "Bear"
- B. "Fish"
- C. "Mosquito"
- D. "Girl"
- E. "Chicken"
- F. "Caterpillar"

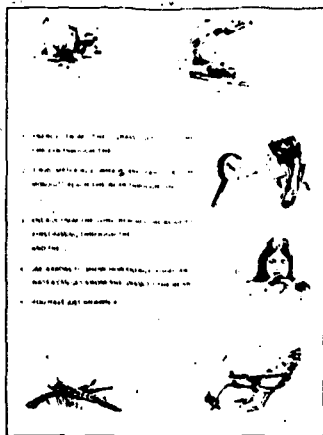
Elicit student responses until all pictures have been identified. Then say:

NOW I'LL READ THE SENTENCES AND YOU CHOOSE A WORD FROM THIS LIST (point to list) TO FILL IN EACH BLANK. DON'T TELL ANYONE ELSE WHAT YOU WROTE. WHEN EVERYONE HAS WRITTEN IN ALL THE WORDS WE WILL TALK ABOUT YOUR ANSWERS.

Read each sentence, pausing long enough for each student to write in his answer.

When all the students are finished, collect the worksheets. Now project Slide 4-3 and again read each statement and have students tell and discuss their answers.

Slide 4-3, Worksheet 4-2



Tally and record worksheet results on Tallysheet 4-1. To record student responses, turn to the Understanding section of the Student Record of Progress. These items assess an understanding of the movement of materials and energy through food chains. In the column headed "Activity 4-2 Transfer Concept," circle a number from 0 through 5 to indicate the degree of success on this



## TEACHING STRATEGIES

Describe each picture have them assist in  
you write on the chalkboard:

"  
"  
quito"  
"  
ken"  
rpillar"

responses until all pictures have been  
then say:

READ THE SENTENCES AND YOU CHOOSE A  
THIS LIST (point to list) TO FILL  
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HAVE YOU  
INVOLVED  
ALL  
STUDENTS?

rd worksheet results on Tallysheet 4-1.  
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Student Record of Progress. These items  
rstanding of the movement of materials and  
food chains. In the column headed  
Transfer Concept," circle a number from 0  
ndicate the degree of success on this

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

worksheet. Note whether students who had difficulty with food chains in Activity 4-1 have now grasped this concept. Decide at this point whether to play the Food Chain Game and use some Change of Pacers to develop this concept further, or to go on to Activity 4-3.

NOTE: If a student's paper indicates a problem with the activity or the worksheet, send it in to BSCS with your comments.

Send in Tallysheet 4-1.

## TEACHING STRATEGIES

Whether students who had difficulty in Activity 4-1 have now grasped this at this point whether to play the Food Use some Change of Pacers to develop this, or to go on to Activity 4-3.

Student's paper indicates a problem with activity or the worksheet, send it in to your comments.

Tallysheet 4-1.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-2

Upon completion of this activity, each student should, as a minimum:

- be able to move food, water, and energy symbols through a food chain
- be able to state that energy, food, and water are transferred along a food chain
- have listed the links in the food chains on Worksheet 4-2.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_\_ Tally \_\_\_\_\_ Rev \_\_\_\_\_

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)					
2.	Minutes of class time on science each day					
3.	Minutes preparing for each day's science class					
4.	Students absent on each date (Use ID Number)					

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST				
MODERATE INTEREST OR INDIFFERENCE				
RESISTANCE OR DISLIKE				

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value -- needs the ☐ Worth salvaging -- make ☐ Worthless

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment: \_\_\_\_\_

Specific Questions:

12. Did any student identify sugar as the food plants make? ☐ No ☐ Yes Who? \_\_\_\_\_  
Comment: \_\_\_\_\_
13. Do you feel that most students understood the idea that energy and matter move from one living thing to another? ☐ Yes ☐ No Comment: \_\_\_\_\_
14. Send in Tallysheet 4-1.

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.



B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components, Diversity and Patterns, Flow of Energy.

#### INQUIRY SKILLS:

Observing, Associating

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task

#### PRACTICAL APPLICATION:

Reading a Story for Meaning, Importance of Protein for a Balanced Diet

## ACTIVITY

### Goals for the Student:

Develop an understanding of the flow of energy through the living world.

Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.

Comprehend the role of man as an integral part of nature not apart from nature.

### Objectives for the Student:

Reconstruct the transfer of energy, food, and water through environmental systems.

Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

### THEME:

Relationships of Environmental Components, Energy and Patterns, Flow of Energy.

### LS:

ing, Associating

### ING SKILLS:

Question and Task

### PLICATION:

a Story for Meaning, Importance of  
for a Balanced Diet

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE A.

ENERGY AND  
MATERIAL TRANSFER

ACTIVITY 4-3. THE LONG JOURNEY:  
A REVIEW



BSCS

Booklet, *The Long Journey*



Activity 4-3. The Long Journey: A Review

*This activity, in story form, traces the flow of food matter through food chains, of which the student is a part.*

Begin by distributing the booklet, *The Long Journey*.

Say:

WE'VE TALKED OF HOW THE MATERIALS THAT MAKE UP FOOD PASS FROM ONE PART OF THE FOOD CHAIN TO ANOTHER. NOW WE ARE GOING TO READ A STORY ABOUT HOW SOME FOOD GOT TO BE A PART OF YOUR BODY.

NOTE: The booklets are designed to be read aloud by the teacher as students follow along. Assist students, especially with vocabulary, and give them a chance to discuss each page. Go through the booklet very slowly, making sure every student understands the idea on each page before going on to the next. Encourage students who get the ideas quickly to help explain the ideas to others.

Below are some specific suggestions and information for various pages in the booklet. Use your discretion on which of this information should be relayed to the students.

Page 2. Give students a chance to answer this question before continuing.

Page 3. Make sure students understand that the picture is not realistic.

Page 5. Body building material here is really nitrogen. Do not mention this unless students ask because it will probably just confuse them.

## TEACHING STRATEGIES

### The Long Journey: A Review

in story form, traces the flow of food food chains, of which the student is a

tributing the booklet, *The Long Journey*.

TALKED OF HOW THE MATERIALS THAT MAKE UP  
SS FROM ONE PART OF THE FOOD CHAIN TO  
NOW WE ARE GOING TO READ A STORY  
OW SOME FOOD GOT TO BE A PART OF YOUR

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uing.

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tic.

building material here is really nitrogen.  
this unless students ask because it will  
confuse them.

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- read the booklet, *The Long Journey*
- demonstrate his understanding of the movement of matter in the environment by tracing a food particle through food chains.



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Diversity and Patterns, Flow of Energy.

#### INQUIRY SKILLS:

Observing, Associating

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task

#### PRACTICAL APPLICATION:

Reading a Story for Meaning, Importance of  
Protein for a Balanced Diet

## ACTIVITY

### Goals for the Student:

- Develop an understanding of the flow of energy through the living world.
- Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
- Comprehend the role of man as an integral part of nature not apart from nature.

### Objectives for the Student:

- Reconstruct the transfer of energy, food, and water through environmental systems.
- Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

### AL THEME:

Relationships of Environmental Components, Quantity and Patterns, Flow of Energy.

### ILLS:

ing, Associating

### IVING SKILLS:

g Question and Task

### PLICATION:

g a Story for Meaning, Importance of  
n for a Balanced Diet

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE A.

ENERGY AND  
MATERIAL TRANSFER

## ACTIVITY 4-3.

THE LONG JOURNEY:  
A REVIEW



BSCS

## MATERIALS

## TEACHING STRATEGIES

Page 6. Give students a chance to answer this question before continuing.

Page 8. Nitrogen makes up about four-fifths of the air.

Page 9. Only a very small part of the nitrogen is washed into the soil.

Page 10. Microbes in the clover root catch the nitrogen and change it so that the plant can use it.

Page 11. The nitrogen is a part of the protein in the clover leaf.

Pages 12, 13, and 14. Digestion is described more fully on Pages 17, 20, and 21. Elaborate here only if students request it.

Page 15. What passed through the hawk was not digested (broken down).

Page 16. Microbes usually break down the droppings before the nitrogen reaches the plants again, but this need not be explained until after the students have learned about decomposers.

Page 17. Students may not know that the stomach makes digestive juices that break up the grass. One of these juices is acid.

Page 18. Write the word "protein" on the board so that students become familiar with the word. It is a word they will meet in relation to diets and foodstuffs.

Page 19. If necessary, emphasize that the meat we eat is really muscle.

Page 21. Students might need some discussion of the anatomy here.



## TEACHING STRATEGIES

students a chance to answer this question  
ing.

en makes up about four-fifths of the air.

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## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-3

Page 22. Explain that this picture shows the root of a hair, with the hair sticking out of the skin, and a blood vessel bringing blood to the root. You may also need to explain that one of the things blood does is carry food to all parts of the body.

Page 23. This is an appropriate place to discuss the importance of protein to our diet. Discuss that we need protein every day to build or repair our bodies. Discuss the foods that give us protein (meat, fish, eggs, cheese, milk, and to some extent beans).

Page 24. At this time students will not be able to answer this question. However, they might speculate about any possible continuations of the long journey (e.g., clothes moth eating hair). *The Long Journey* will be referred to again when students know about decomposers, and they will realize that microbes will break down the hair after the person has died, and the body building material will go back into the soil to be used again by plants.

After reading the booklet, ask students to draw two food chains found in *The Long Journey*. When they have had time to complete their own food chains, discuss the chains and have some students draw them on the chalkboard. These can be connected to go all the way from air to themselves. The two food chains in *The Long Journey* are the chain from clover to hawk:

clover → grasshopper → frog → snake → hawk

and the chain from grass to themselves:

grass → cow → me.

Then these chains can be linked by the other steps in *The Long Journey* from the air to themselves. To link the two food chains, add → hawk (dropping → between hawk and grass.

## TEACHING STRATEGIES

Explain that this picture shows the root of a hair sticking out of the skin, and a blood vessel carrying blood to the root. You may also need to explain one of the things blood does is carry food to the body.

This is an appropriate place to discuss the importance of protein to our diet. Discuss that we need protein every day to build or repair our bodies. Discuss what gives us protein (meat, fish, eggs, cheese, and some extent beans).

At this time students will not be able to ask a question. However, they might speculate on possible continuations of the long journey (the moth eating hair). *The Long Journey* will be discussed again when students know about decomposers, and realize that microbes will break down the body of a person who has died, and the body building materials will go back into the soil to be used again by plants.

After reading the booklet, ask students to draw two food chains in *The Long Journey*. When they have had time to draw their own food chains, discuss the chains and have the students draw them on the chalkboard. These chains led to go all the way from air to themselves. The chains in *The Long Journey* are the chain from the air to the hawk:

→ grasshopper → frog → snake → hawk

from grass to themselves:

cow → me.

These chains can be linked by the other steps in the chain. They go from the air to themselves. To link the chains, add → hawk (dropping → between hawk and cow).

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

Air and ground can then be added at the front of the chain, beginning with clover, to show where the body building material in themselves originally came from:

air → ground → clover.

Remind students that plants make their own food and use things from the air and ground to do so.

When you feel students understand the sequence from the air to themselves, place an arrow before the word "air" and after the word "me." Refer them to the last page in *The Long Journey* and ask them what these arrows might mean.

## TEACHING STRATEGIES

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and ask them what these arrows might

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY

4-3

Students should:

--respond, "The journey keeps going," "Something happens to me when I die," "The stuff in the air probably came from somewhere else."

*Upon completion of this activity, each student should, as a minimum:*

*--be able to trace the movement of "body building material" through food chains.*

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_\_ Tally \_\_\_\_\_ Rev \_\_\_\_\_

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST						
MODERATE INTEREST OR INDIFFERENCE						
RESISTANCE OR DISLIKE						

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value -- needs the

Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment: \_\_\_\_\_

### Specific Questions:

12. Could students trace body building material through a food chain?



Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.



- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Diversity and Patterns, Flow of Energy

#### INQUIRY SKILLS:

Identifying, Associating, Predicting

#### PROBLEM-SOLVING SKILLS:

Organizing Data

#### PRACTICAL APPLICATION:

Working in a Group, Following Instructions,  
Respect for Nature

## ACTIVITY

### Goals for the Student:

- Develop an understanding of the flow of energy through the living world.
- Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
- Comprehend the role of man as an integral part of nature not apart from nature.

### Objectives for the Student:

- Reconstruct the transfer of energy, food, and water through environmental systems.
- Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

### AL THEME:

Relationships of Environmental Components, Quantity and Patterns, Flow of Energy

### LS:

Fying, Associating, Predicting

### ING SKILLS:

ing Data

### PLICATION:

in a Group, Following Instructions,  
for Nature

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE A.

ENERGY AND  
MATERIAL TRANSFER

## ACTIVITY 4-4. FOOD WEBS



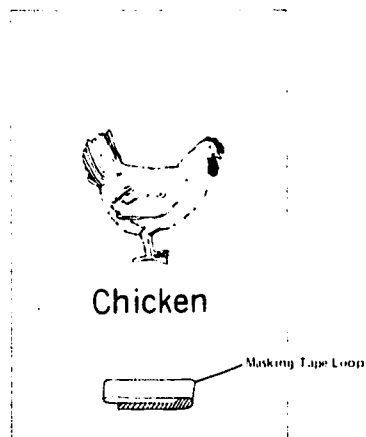
BSCS

ACTIVITY  
4-4

MATERIALS

- 1 Deck of Food Web flash cards
- \*Scissors
- \*Yarn, 6-8 balls of different colors
- \*Tape, masking or hook Velcro

Diagram 4-1



TEACHING STRATEGIES

Activity 4-4. Food Webs

*The transfer of energy and materials is now expanded into the context of the food web. Students will be given the opportunity to review the concepts associated with food webs that were presented in Unit III.*

Teacher Preparation:

1. Move desks and chairs to prepare an open area in the classroom where the flash cards can be arranged on the floor in a circle ten or twelve feet in diameter. (The gym floor, open space in the library, a large hallway, or any other similar area could also be used.)
2. While all the flash cards are appropriate to use, it is recommended that the bird, turtle, spider, and fish cards be removed from the deck prior to the start of this activity since very few chains can be constructed using these cards.
3. At the bottom of each card attach a flattened loop of masking tape so that a two- or three-inch strip of the sticky side of the tape is facing up. This strip should be centered below the name appearing on the front of each card. (See Diagram 4-1.) Alternatively, a piece of Velcro (hook side) can be stuck on the card.

Begin this activity by distributing one or more flash cards to each student and having them arrange the cards on the floor in a circle, ten to twelve feet in diameter. Names on the cards should face the center of the circle. Have students stand around the outside of the circle behind one of the animal cards.

Begin the activity by selecting one of the students to construct a food chain while the others watch.

## TEACHING STRATEGIES

### Food Webs

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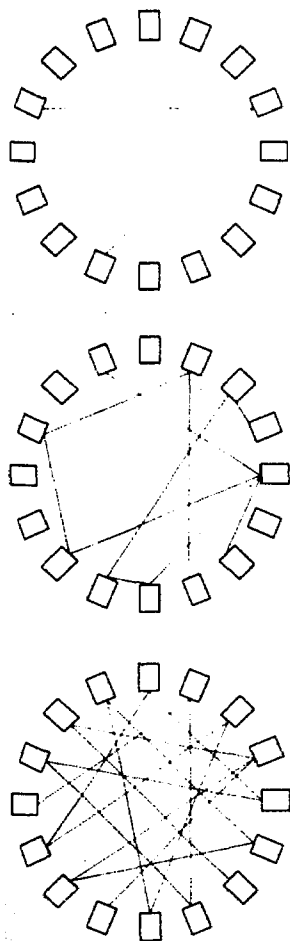
## ANTICIPATED STUDENT BEHAVIORS

*During this activity, each student should:*

- participate in the food web yarn activity by constructing one or more food chains*
- identify food chains and food webs*
- realize that a disturbance in any part of the food web will ultimately be felt in the whole food web.*

## MATERIALS

Diagram 4-2



## TEACHING STRATEGIES

IF YOU WERE A (name of animal chosen), WHAT OTHER LIVING THING WOULD YOU NORMALLY EAT?

Give a ball of yarn and scissors to the student making the food chain. Instruct him to attach the end of his yarn to the masking tape or Velcro on the card depicting the animal chosen. The yarn should then be stretched out and attached in the same manner to the animal's food source. Ask the student to identify a living thing that this food source might eat. If the student cannot identify a food source, have the class help him. When a food source is identified, have him stretch and attach the yarn to the new food source. Continue identifying food sources until a plant is reached. Then instruct the student to cut the yarn. (See Diagram 4-2.) At this point, ask:

WHAT HAVE YOU MADE?

WHAT DOES THE PIECE OF YARN REPRESENT?

Select another student to start a new food chain. Any card can be used more than once. Challenge them to make the chains as long as possible. Continue with this procedure until a maze of yarn is created between the cards. Care must be taken in attaching yarn to the cards so that the cards do not become scattered. If a different color yarn is used for each food chain, it will be easier for students to distinguish between the chains.

Then ask:

WHAT DOES EACH COLOR OF YARN STAND FOR?

HOW MANY FOOD CHAINS DID WE MAKE?

## TEACHING STRATEGIES

A (name of animal chosen), WHAT  
G THING WOULD YOU NORMALLY EAT?

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CH COLOR OF YARN STAND FOR?

D CHAINS DID WE MAKE?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-4

Students should:

--recall the Food Chain Game and identify what  
they would normally eat.

--respond, "Food chain."

--respond, "Food chain," "Food going from one  
thing to another."

--respond, "A food chain."

--respond, "Lots," "A bunch."

WHAT DO ALL THE CRISSCROSSING LINES REMIND YOU OF?

If students do not suggest that the crisscrossing lines suggest a web, ask:

WHAT DOES A SPIDER MAKE?

WHAT WOULD BE A GOOD NAME FOR WHAT WE HAVE MADE?

Then say:

A GROUP OF FOOD CHAINS CONNECTED TOGETHER IS CALLED A FOOD WEB. (Write "Food Web" on the chalkboard.) WHY DO YOU THINK IT'S CALLED A FOOD WEB?

WHAT'S THE DIFFERENCE BETWEEN A FOOD WEB AND A FOOD CHAIN?

Ask the students once again to stand behind a card. Make up a disastrous situation involving one of the animals represented on the cards. Try to involve an animal that has many strings attached to its card.

The situation should be as lifelike as possible. Examples might be: a drought hits an area and wipes out all the grain for a year; hunters shoot all of the hawks in an area; an insecticide kills all of the mosquitoes; all of the deer die of a mysterious disease, and so forth.



## TEACHING STRATEGIES

ALL THE CRISSCROSSING LINES REMIND

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out the rain for a year; hunters shoot all of the  
deer; an insecticide kills all of the  
insects; all of the deer die of a mysterious disease,

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "A web," "A mess," "Everything is  
tangled up."

--respond, "Spiders make webs."

--associate a spider web with the class activity  
and respond, "Food web."

--respond, "Because it looks like a spider's web."

--compare the two and indicate that a food web  
shows many food chains and how they are connected.  
Respond with statements such as, "A web is many  
food chains."

## MATERIALS

## TEACHING STRATEGIES

After describing the disaster to the students, have the student who is standing by that card kneel and lift his card about a foot off the floor. Then have all of the students standing behind the cards that are directly affected by the lifted card kneel and raise their cards. Then have all those that are affected by the second movement kneel and raise their cards, and so forth. The yarns should be so interconnected that all or nearly all of the students will have been affected by the raising of the cards.

Say:

REMEMBER, EACH PLANT OR ANIMAL CARD STANDS FOR ALL OF THAT KIND OF PLANT OR ANIMAL IN ONE BIG AREA.

Discuss the disaster you chose to take place in a manner similar to the strategy below, substituting different animal and plant names where necessary.

WHAT WOULD HAPPEN TO OUR FOOD WEB IF THE GRASSES WERE DESTROYED OR RUINED?

DEER EAT GRASSES. WHAT WOULD HAPPEN IF ALL THE DEER DIED?

IF THE DEER WERE GONE, WHAT WOULD THE MOUNTAIN LION EAT?

HOW MANY RABBITS DO YOU THINK THE LION WOULD NEED TO EAT TO EQUAL ONE DEER?

IF THE MOUNTAIN LION STARTS EATING UP ALL THE RABBITS WHAT WILL THE HAWK DO?

## TEACHING STRATEGIES

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AIN LION STARTS EATING UP ALL  
WHAT WILL THE HAWK DO?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-4

Students should:

--respond, "Some animals would go hungry," "Some  
animals would die," "Many animals would suffer."

--respond, "People couldn't hunt any more," "The  
mountain lion would get hungry."

--look at the food web and respond, "Rabbits,"  
"Mice," "Cows."

--respond, "Lots," "A whole bunch."

--respond, "Eat something else," "Eat more  
mice or snakes."

**MATERIALS**

**TEACHING STRATEGIES**

WHAT DOES THE FARMER OR RANCHER GROW THAT THE MOUNTAIN LION MIGHT EAT INSTEAD OF THE DEER?

HOW WOULD THIS AFFECT THE FARMER?

FROM WHAT YOU HAVE LEARNED ABOUT FOOD WEBS DO YOU THINK ANIMALS CAN LIVE ALL BY THEMSELVES?

Depending on the interest and understanding of your students, you may wish to select another animal and "eliminate" it through a disaster. Follow through with the effects this will have on other living things in the web.

Continue by asking:

ARE PEOPLE IN FOOD WEBS?

HOW ARE WE AFFECTED IF SOMETHING HAPPENS TO OTHER LIVING THINGS IN OUR FOOD WEB?

COULD PEOPLE LIVE WITHOUT OTHER PLANTS AND ANIMALS IN THEIR ENVIRONMENT?

WHY NOT?

See Change of Pacers 4 and 5.

CHANGE

## TEACHING STRATEGIES

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N LION MIGHT EAT INSTEAD OF THE DEER?

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OPLE LIVE WITHOUT OTHER PLANTS AND  
IN THEIR ENVIRONMENT?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Cows," "Chickens," "Pigs."

--infer, "He might go hungry," "Go broke," "He'd  
get mad."

--conclude that the living things they have  
studied depend on one another and respond, "No."

--respond, "Yes."

--infer, "We'd have less to eat," "We'd have to  
eat other things," "We wouldn't be able to use  
animals for as many things."

--respond, "No."

--respond, "We need other living things for our  
food, clothing, and other things."

*Upon completion of this activity, each student  
should, as a minimum:*

--have helped to construct one or more food chains  
using the yarn and the plant and animal flash cards  
--be able to state that all living things depend  
on each other.



CHANGE OF PACER

Activity name suggested by class: \_\_\_\_\_

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_\_ Tally \_\_\_\_\_ Rev \_\_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity: \_\_\_\_\_

Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
 --keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment: \_\_\_\_\_

#### Specific Questions:

12. Could most students distinguish the difference between food chain and food web?  
☐ Yes ☐ No Comment:
13. Were the effects of a disaster (like a drought) on a food web understood by most students? ☐ Yes ☐ No

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.



B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Diversity and Patterns

#### INQUIRY SKILLS:

Observing, Identifying, Associating

#### PROBLEM-SOLVING SKILLS:

Recording Data, Discussion and Treatment of  
Group Data

#### PRACTICAL APPLICATION:

Working in Groups, Practicing Good Manners

## ACTIVITY

### Goals for the Student:

Develop an understanding of the flow of energy through the living world.

Comprehend the role of man as an integral part of nature not apart from nature.

### Objectives for the Student:

Reconstruct the transfer of energy, food, and water through environmental systems.

Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

### THEME:

Relationships of Environmental Components, Energy and Patterns

### US:

Identifying, Associating

### ING SKILLS:

g Data, Discussion and Treatment of Data

### LICATION:

in Groups, Practicing Good Manners

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE A.

ENERGY AND  
MATERIAL TRANSFER

## ACTIVITY 4-5.

FOOD WEBS IN  
MY COMMUNITY



BSCS

\*Clipboard

\*Not furnished in materials kit

Activity 4-5. Food Webs in My Community

*This activity will introduce/reacquaint students with some plants and animals in their area. They will be given more practice building food webs. This time, however, students will be working with plants and animals within their own community. Because the plants and animals will be familiar to the students, this food web will provide a more concrete model than the previous one.*

Teacher Preparation:

Prior to this activity you will want to locate a convenient outdoor place where you can take your class for this field trip. It should be as rich in plant and animal life as possible. A place within easy walking distance is preferable. Caution the students not to destroy unnecessarily any plants or animals in the place visited.

Selection of a zoo or science museum as an alternate place to visit will defeat the intended purpose of the activity, since the majority of animals and plants present there are unlikely to be representative of the local area.

Begin this activity by asking:

IF WE WANTED TO TAKE A SHORT TRIP TO FIND A LOT OF PLANTS AND ANIMALS, WHERE COULD WE GO?

As each place is suggested ask the following questions:

WILL THERE BE A LOT OF PEOPLE THERE?

WHO OWNS IT?

HOW CAN WE GET PERMISSION TO VISIT THAT PLACE?

## TEACHING STRATEGIES

### Food Webs in My Community

you will introduce/reacquaint students with some animals in their area. They will be given more building food webs. This time, however, students are working with plants and animals within their own community. Because the plants and animals will be familiar to the students, this food web will provide a more realistic model than the previous one.

#### Preparation:

For this activity you will want to locate a convenient place where you can take your class for this field trip. It should be as rich in plant and animal life as possible. A place within easy walking distance is best. Caution the students not to destroy unnecessary plants or animals in the place visited.

If a zoo or science museum as an alternate site, it will defeat the intended purpose of the activity since the majority of animals and plants present are unlikely to be representative of the local area.

Begin the activity by asking:

IF I WANTED TO TAKE A SHORT TRIP TO FIND A LOT OF PLANTS AND ANIMALS, WHERE COULD WE GO?

IF I WERE THERE, WHAT QUESTIONS WOULD I LIKE TO ASK?

WHAT WOULD BE A LOT OF PEOPLE THERE?

WHAT WOULD WE SEE?

WHAT WOULD WE GET PERMISSION TO VISIT THAT PLACE?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- identify several plants and animals found in his area
- recognize relationships of plants and animals in his area
- supply to the teacher the names of several local plants and animals to be recorded on Tallysheet 4-2.

Students should:

--respond by naming various places in their area.

--respond with such comments as, "Maybe," "Yes," "No."

--respond, "City," "Somebody," "I don't know," "The mayor."

--respond with statements such as, "Talk to the owner," "Call the person that owns it," "Ask at the mayor's office."

## MATERIALS

## TEACHING STRATEGIES

Discuss all the various areas that could be visited and eventually arrive at as much of a universal agreement as is possible. Try not to dictate the spot - let students discuss the problem and weigh all the considerations.

Then say:

WHEN WE VISIT THE (place) WHAT KINDS OF PLANTS  
AND ANIMALS DO YOU THINK WE WILL FIND?

As students make suggestions, write them on the chalkboard in two columns - "Plant" and "Animal." If there is any confusion about what is plant or animal, it should be clarified at this time. Students may not think of a fish, a bird, or an insect as an animal, for example. If this problem arises, it would be a good time to review the grouping work done earlier in Unit I.

If the space on the chalkboard is not needed, leave the list of plants and animals on the chalkboard until after the trip. If the space is needed, have a student copy the list for a permanent record, to be referred to later.

### The Day of the Field Trip:

If the weather is bad, postpone the field trip and see Activity 4-6 for an alternate lesson.

Briefly review with the students the conduct you expect from them on the field trip.

NOTE: Students should be paired for the trip. Tell each group (pair) to identify for you at least three plants and three animals from the area. Direct them to tell you the name of each organism and whether or not it is a plant or an animal. If you question the presence of the living thing, ask to see it or indicate evidence of it. Encourage

## TEACHING STRATEGIES

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## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-5

Students should:

--guess some of the plants and animals they expect  
to find in the area visited.

## TEACHING STRATEGIES

students to wander around and find as many living things as possible. Also, urge students to collect indirect evidence such as a feather, a bone, hair, an acorn, a leaf, or tracks.

Record the names of the two students in each team on Tallysheet 4-2 and take it along on the field trip to check off plants and animals that each team finds. (The tallysheet may be attached to a clipboard for ease in writing.) If you must tell the student the name of the living thing, make an asterisk in the animal column for that team. (See Diagram 4-3.)

Allow students to list duplicate organisms, but strive to obtain variety by asking them to bring in more names if they all select the same organisms.

Some teams may have difficulty supplying the specific names of animals, such as "robin" or "hawk", in which case you can use a group name as a category, such as "birds" or "bugs". The same will be true of plants.

When back inside the classroom, have students compare their predictions with their actual findings. Do this by writing on the chalkboard the list of plants and animals the students saw as they call them out to you. Place this list next to those listed before the field trip. Have students circle the names of any organisms which occur on one list but not on the other. (If some predicted before the field trip that a robin might be seen, but no robin was reported, circle robin.)

WHY DIDN'T WE SEE ALL OF THE PLANTS AND ANIMALS  
WE THOUGHT WE WOULD SEE?

Diagram 4-3

[illegible]



## TEACHING STRATEGIES

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select the same organisms.

ay have difficulty supplying the specific  
mals, such as "robin" or "hawk", in which  
use a group name as a category, such as  
bugs". The same will be true of plants.

side the classroom, have students compare  
tions with their actual findings. Do this  
n the chalkboard the list of plants and  
students saw as they call them out to you.  
list next to those listed before the field  
students circle the names of any organisms  
on one list but not on the other. (If some  
fore the field trip that a robin might be  
robin was reported, circle robin.)

W'T WE SEE ALL OF THE PLANTS AND ANIMALS  
HT WE WOULD SEE?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "I don't know," "Some were asleep,"  
"Some were dead," "Some spend only part of their  
time there," "They were there but we just missed  
them," "We made a mistake."

## MATERIALS

## TEACHING STRATEGIES

WHAT LIVING THINGS DID WE FIND THAT WE DIDN'T EXPECT?

WHAT LIVING THINGS WERE REPORTED THE MOST?

Each plant and animal will now be discussed, and then used in making a food web. Distribute one 3 X 5 card to each student. Direct the students to write on his card the name of a specific plant or animal from the list. Then have students place cards on the bulletin board in a rough circle.

Begin the class discussion by pointing to a card.

Ask:

WHAT IS THIS (plant or animal) LIKE?

WHAT DOES IT EAT?

Or in case of a plant, ask:

WHAT EATS IT?

(Student's name) WILL YOU GO TO THE BULLETIN BOARD AND PLACE A STRING (YARN OR MASKING TAPE) TO CONNECT THE (animal) WITH THE PLANT IT EATS?

Continue the questioning and the student involvement until all plants and animals have been connected by at least one string. Throughout the discussion, emphasize the interdependency of living things on one another. When all organisms are connected, ask:

WHAT HAVE WE MADE ON THE BULLETIN BOARD?

## TEACHING STRATEGIES

THINGS DID WE FIND THAT WE DIDN'T

THINGS WERE REPORTED THE MOST?

animal will now be discussed, and then  
food web. Distribute one 3 X 5 card  
Direct the students to write on his  
a specific plant or animal from the  
students place cards on the bulletin  
circle.

discussion by pointing to a card.

S (plant or animal) LIKE?

T EAT?

case of a plant, ask:

ATS IT?

(name) WILL YOU GO TO THE BULLETIN  
PLACE A STRING (YARN OR MASKING  
CONNECT THE (animal) WITH THE PLANT

questioning and the student involvement until  
animals have been connected by at least  
throughout the discussion, emphasize the  
of living things on one another. When  
connected, ask:

MADE ON THE BULLETIN BOARD?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-5

Students should:

--list the things circled in the field trip list.

--identify the most common things observed during  
the trip.

--respond according to the organisms specified.

--respond by naming the food involved.

--connect the two organisms with yarn or tape.

--respond, "Food web," "Food chain."

**MATERIALS**

**TEACHING STRATEGIES**

WHAT WOULD HAPPEN IF ALL OF THE (name of local plant or animal) WERE TO DISAPPEAR SUDDENLY?

Because of the lack of knowledge of the habits of all the local plant and animal life it may be difficult for some of the students to draw the proper inferences. Guide the discussion so the students conclude that if anything happens to one group of living things, one or more other groups is likely to be affected. For example, if no one feels that the disappearance of trees would affect animals, ask:

WHERE WOULD SQUIRRELS LIVE IF THERE WERE NO TREES? WHERE WOULD BIRDS BUILD THEIR NESTS?

IF ALL THE INSECTS WERE TO DISAPPEAR, WHAT WOULD BIRDS THAT EAT MOSTLY INSECTS EAT TO KEEP FROM STARVING?

IF ALL THE BIRDS THAT EAT INSECTS WERE TO DISAPPEAR SUDDENLY, WHAT WOULD HAPPEN TO THE NUMBER OF INSECTS?

Encourage students to suggest and discuss other living things whose disappearance would affect groups of living things.

## TEACHING STRATEGIES

WHAT WOULD HAPPEN IF ALL OF THE (name of local animal) WERE TO DISAPPEAR SUDDENLY?

Due to lack of knowledge of the habits of all the animal life it may be difficult for some students to draw the proper inferences. Guide the students to conclude that if anything happens to a group of living things, one or more are likely to be affected. For example, if a tree were to disappear, that the disappearance of trees would affect

WHAT WOULD HAPPEN IF THERE WERE NO TREES? WHERE WOULD BIRDS BUILD THEIR NESTS?

WHAT WOULD HAPPEN IF ALL INSECTS WERE TO DISAPPEAR, WHAT WOULD HAPPEN TO THE BIRDS THAT EAT MOSTLY INSECTS? WOULD THEY STARVE?

WHAT WOULD HAPPEN IF ALL BIRDS THAT EAT INSECTS WERE TO DISAPPEAR SUDDENLY, WHAT WOULD HAPPEN TO THE INSECTS?

Encourage students to suggest and discuss other living things whose disappearance would affect groups of living things.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--infer that if something happens to one group of living things, another group suffers.

--recognize that trees have an effect and respond, "They wouldn't have a place to live," "They'd have to go someplace else."

--respond, "Eat seeds," "Eat something else or die."

--respond, "There would be lots more," "More would grow."

## MATERIALS

## TEACHING STRATEGIES

Send in Tallysheet 4-2.

See Change of Pacers 6 and 7.

  
CHANGE OF

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-5

*Upon completion of this activity, each student should, as a minimum:*

- identify by observation or inferences one plant and one animal living in the local area*
- state how the disappearance of one group of plants or animals might possibly affect other living things*
- be able to complete links in a food web.*

heet 4-2.



acers 6 and 7.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_ Tally \_\_\_\_ Rev \_\_\_\_

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)					
2.	Minutes of class time on science each day					
3.	Minutes preparing for each day's science class					
4.	Students absent on each date (Use ID Number)					

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☒ Worthwhile ☐ Of value--needs the☐ North saluadine--make ☐ Worthwhile



7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

#### Specific Questions:

12. Was the concept of interdependency grasped by most students? ☐ Yes ☐ No  
 What evidence do you have for your answer?

13. Did the local area contain enough organisms to do the activity? ☐ Yes ☐ No

14. Send in Tallysheet 4-2.

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Diversity and Patterns

#### INQUIRY SKILLS:

Inferring

#### PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

#### PRACTICAL APPLICATION:

Practicing Communication Skills



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
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#### ENVIRONMENTAL THEME:

Diversity and Patterns

#### INQUIRY SKILLS:

Inferring

#### PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

#### PRACTICAL APPLICATION:

Practicing Communication Skills

**ACTIVITY  
4-6**

**MATERIALS**

Slide 4-4 through 4-9  
\*35 mm Slide projector

Slide 4-4



\*Not furnished in materials kit

**TEACHING STRATEGIES**

Activity 4-6. Food Webs in Other Places

*This activity is designed to show students some environments other than the one they visit. It will allow them to infer the conditions in these environments. Students will also have an opportunity to relate obvious environmental conditions to the plants and animals of an area.*

Teacher Preparation:

For your information, a few examples of the plants and animals that might be found in the areas shown in the slides are listed below.

<u>Plants</u>	<u>Animals</u>
4-4 Water Plants	Octopus, Lobsters, Sponge, Sharks, Whales, Crayfish, Frogs, Snails, Clams
4-5 Cypress, Spanish Moss, Mangroves, Lilies	Snake, Deer, Turtle, Alligator
4-6 Pines, Grass, Aspen, Fir, Mosses, Ferns, Berries	Deer, Bear, Cougar, Bobcat, Wolf, Squirrel, Chipmunk, Moose
4-7 Grass, Sagebrush, Bushes	Jackrabbit, Prairie Dog, Fox, Coyote, Deer, Rattlesnake
4-8 Cactus, Yucca, Chaparral, Sagebrush	Fox, Rattlesnake, Gerbil, Owl
4-9 Grass, Trees, Shrubs, Flowers	Lion, Zebra, Giraffe, Hyena, Vulture, Deer

## TEACHING STRATEGIES

### Food Webs in Other Places

is designed to show students some environments other than the one they visit. It will allow them to observe conditions in these environments. Students will have an opportunity to relate obvious environmental conditions to the plants and animals of an area.

### Preparation:

Information, a few examples of the plants and animals that might be found in the areas shown in the list below.

<u>Plants</u>	<u>Animals</u>
Plants	Octopus, Lobsters, Sponge, Sharks, Whales, Crayfish, Frogs, Snails, Clams
, Spanish Mangroves,	Snake, Deer, Turtle, Alligator
Grass, Fir, Mosses, Berries	Deer, Bear, Cougar, Bobcat, Wolf, Squirrel, Chipmunk, Moose
Sagebrush,	Jackrabbit, Prairie Dog, Fox, Coyote, Deer, Rattlesnake
Yucca, al, Sage-	Fox, Rattlesnake, Gerbil, Owl
Trees, Flowers	Lion, Zebra, Giraffe, Hyena, Vulture, Deer

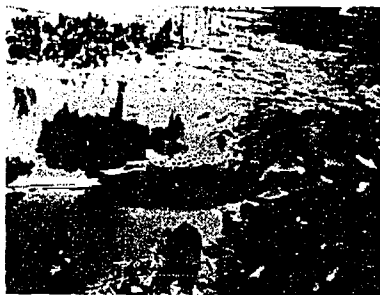
## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe a series of slides of various environments
- participate in a discussion of the various environments
- make inferences about characteristics of unknown environments.

## MATERIALS

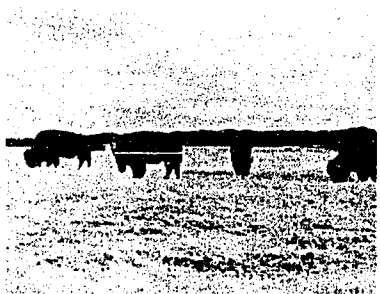
Slide 4-5



Slide 4-6



Slide 4-7



## TEACHING STRATEGIES

As much student discussion as possible should accompany these slides. The students should be asked to think of other living things they might expect to find in each area pictured. There might also be indirect evidence of some organisms that the students could use as a clue to the presence of an animal -- for example, a feather from a cardinal.

As each slide is shown, ask this series of questions:

WHERE WAS THIS PICTURE TAKEN? WHY DO YOU THINK SO?

WHAT KINDS OF PLANTS DO YOU SEE?

WHAT KINDS OF ANIMALS DO YOU SEE?

DO THESE ANIMALS (PLANTS) LIVE AROUND HERE?

WHICH ONES COULD WE NOT FIND IN OUR AREA? WHY?

WHAT OTHER PLANTS (ANIMALS) DO YOU SUPPOSE LIVE AT THIS PLACE? WHY? HOW DO YOU KNOW?

WHAT IS THE WEATHER LIKE AT THIS PLACE?

WHAT DO THE ANIMALS IN THE PICTURE EAT? WHAT EATS THEM?



## TEACHING STRATEGIES

discussion as possible should accompany the students should be asked to think of things they might expect to find in each. There might also be indirect evidence that the students could use as a clue of an animal -- for example, a feather

shown, ask this series of questions:

THIS PICTURE TAKEN? WHY DO YOU

OF PLANTS DO YOU SEE?

OF ANIMALS DO YOU SEE?

ANIMALS (PLANTS) LIVE AROUND HERE?

WOULD WE NOT FIND IN OUR AREA?

PLANTS (ANIMALS) DO YOU SUPPOSE  
PLACE? WHY? HOW DO YOU KNOW?

WEATHER LIKE AT THIS PLACE?

ANIMALS IN THE PICTURE EAT? WHAT

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-6

Students should:

- infer the locations of the pictures and tell what they used as clues.
- describe in general terms the plants in the pictures.
- describe the animals in the pictures.
- identify local plants and animals as much as possible.
- identify those plants and animals not found in the area and give reasons why not, such as, "No food," "Too large," "Too cold," "Too wet," "Too dry," "Too many people," and so forth.
- infer what other plants and animals live there.
- speculate about the climate of the place.
- describe possible food sources of animals described.

Slide 4-8



Slide 4-9



WHY DO THE LIVING THINGS PICTURED DEPEND ON EACH OTHER?

LETS USE THE PLANTS AND ANIMALS IN THE PICTURE AND THE ONES YOU SUGGESTED, TO MAKE A FOOD CHAIN.

Put the food chain suggested by the students on the chalkboard.

COULD YOU LIVE AT THIS PLACE? WHY? WHY NOT?

Continue with this line of questioning for each slide.

See Change of Pacers 8 and 9.

CHANG

## TEACHING STRATEGIES

THE LIVING THINGS PICTURED DEPEND ON  
OTHER?

USE THE PLANTS AND ANIMALS IN THE PICTURE  
THE ONES YOU SUGGESTED, TO MAKE A FOOD

chain suggested by the students on the

YOU LIVE AT THIS PLACE? WHY? WHY NOT?

With this line of questioning for each slide.



CHANGE OF PACER

Use Pacers 8 and 9.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--recognize food relationships and make  
responses such as, "The buffalo eats grass,"  
"The \_\_\_\_\_ eats \_\_\_\_\_."

--suggest which plants and animals would fit into  
a food chain.

--speculate on their life needs and decide if the  
pictured environment could satisfy those needs.

*Upon completion of this activity, each student  
should, as a minimum:*

- have participated in the description of one or  
more of the slides*
- have made at least one inference about one of the  
pictured environments.*

tivity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE:	Post	Tally	Rev
-----------	------	-------	-----

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

- Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
- Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes --- Pages and Problem:
- Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
- Were teacher instructions clear enough to follow? ☐ Yes ☐ No --- Pages and Problem:
- Did you omit any part(s) of this activity? ☐ Yes ☐ No --- Identify which part(s) were omitted and WHY:
- Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
 --keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment: \_\_\_\_\_

#### Specific Questions:

12. For each slide check the appropriate box if your class was able to name other plants, animals, weather or food related to the slide:

	4-4	4-5	4-6	4-7	4-8	4-9
	Fish	Crocodile	Elk	Buffalo	Snake	Lion
Plants						
Animals						
Weather						
Food						

13. Could students construct food chains from plants and animals pictured?  
☐ All ☐ Some ☐ Few ☐ None

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core A Objectives for the Student:

1. Reconstruct the transfer of energy, food, and water through environmental systems.
2. Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components, Complementarity of Organisms and Environment, Flow of Energy

#### INQUIRY SKILLS:

Identifying, Associating, Describing

#### PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

#### PRACTICAL APPLICATION:

Following Directions, Practice Communication Skills



## ACTIVITY

### Goals for the Student:

- Develop an understanding of the flow of energy through the living world.
- Comprehend the role of man as an integral part of nature not apart from nature.

### Objectives for the Student:

- Reconstruct the transfer of energy, food, and water through environmental systems.
- Recognize the existence and importance of interrelationships between plants and animals as a result of eating and being eaten.

### AL THEME:

Relationships of Environmental  
Elements, Complementarity of Organisms and  
Environment, Flow of Energy

### ILLS:

Identifying, Associating, Describing

### IVING SKILLS:

Reasoning, Defending, Answering Why Questions

### APPLICATION:

Following Directions, Practice Communication

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE A.

ENERGY AND  
MATERIAL TRANSFER

## ACTIVITY 4-7. CLUES TO SUCCESS



BSCS

ACTIVITY  
4-7

MATERIALS

Worksheet 4-3  
Slides 4-10 through 4-13  
\*Many magazines containing plant  
and animal pictures  
\*Scissors  
\*Butcher paper  
\*Large felt pens or crayons  
\*Paste or tape  
\*35 mm Slide projector

\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-7. Clues to Success

*This clue to success is divided into two parts. The first is structured. Its completion should aid in the success of the second, which is relatively unstructured to allow latitude for the student's imagination.*

CLUES

Part 1.

Before giving students Worksheet 4-3, turn to the Progress in Following Directions page of the Student Record of Progress. Use the guidelines to rate your students on their ability to follow directions. Distribute Worksheet 4-3.

Then say:

FIRST FIND SIDE A OF YOUR WORKSHEET. NOW, LISTEN CAREFULLY. WE ARE GOING TO PRACTICE FOLLOWING DIRECTIONS. LISTEN VERY CAREFULLY AND DO THINGS JUST AS I ASK YOU TO. I WILL REPEAT EACH DIRECTION ONLY ONE TIME.

PRINT YOUR NAME IN THE SPACE AT THE TOP OF THE WORKSHEET.

## TEACHING STRATEGIES

### Clues to Success

Success is divided into two parts. The first is structured. Its completion should aid in the second, which is relatively unstructured and allows for the student's imagination.



Give students Worksheet 4-3, turn to the Progress Directions page of the Student Record of Use the guidelines to rate your students on their ability to follow directions. Distribute Worksheet

TURN TO THE OTHER SIDE OF YOUR WORKSHEET. NOW, LISTEN CAREFULLY. WE ARE GOING TO PRACTICE FOLLOWING DIRECTIONS. LISTEN VERY CAREFULLY AND DO THINGS AS I ASK YOU TO. I WILL REPEAT EACH DIRECTION TWICE.

WRITE YOUR NAME IN THE SPACE AT THE TOP OF THE WORKSHEET.

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

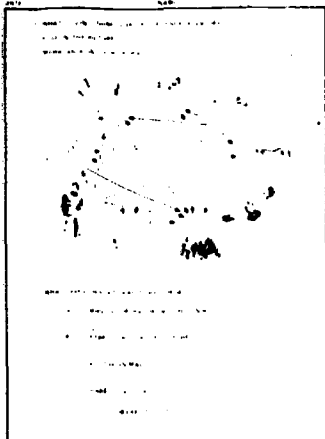
- answer each of the four instructional assessment questions on Worksheet 4-3
- cut out of magazines pictures of plants and animals that are related
- indicate with lines on his food web some interrelationships between the plants and animals
- explain to the class how materials and energy move through his food web
- explain to the class how the disappearance of one kind of organism in his food web might affect other organisms in the web.

Students should:

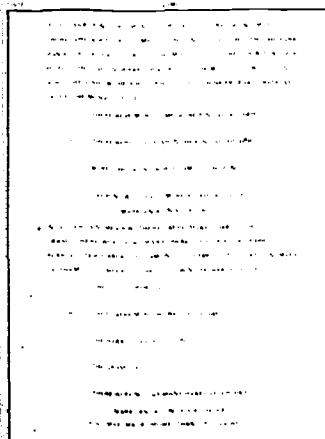
- print their name in the space at the top of the worksheet.

## MATERIALS

Slide 4-10 and 4-11,  
Worksheet 4-3A



Slide 4-12 and 4-13,  
Worksheet 4-3B



## TEACHING STRATEGIES

Pause; repeat the direction; pause again; then say:

PRINT THE DATE UNDER YOUR NAME.

Pause; repeat the direction; pause again; then say:

MARK AN X IN THE LOWER RIGHT-HAND CORNER OF THE WORKSHEET.

Pause; repeat the direction; pause again; then say:

CIRCLE THE WORKSHEET NUMBER.

Pause; repeat the direction; pause again; then say:

DRAW A BOX AROUND YOUR NAME.

Pause; repeat the direction; pause again; then say:

NOW WE ARE GOING TO ANSWER SOME QUESTIONS ABOUT FOOD WEBS.

Read each question and possible answers aloud to the students, while projecting the slides in order for each question. Repeat each question and allow ample time for the students to mark their worksheets.

When the students are finished, collect the worksheets. Then project Slides 4-10 through 4-12 again, discussing the questions and answers with them. Encourage students to defend their choices. After class, tally the students'

## TEACHING STRATEGIES

the direction; pause again; then say:

DATE UNDER YOUR NAME.

the direction; pause again; then say:

IN THE LOWER RIGHT-HAND CORNER OF THE

the direction; pause again; then say:

WORKSHEET NUMBER.

the direction; pause again; then say:

AROUND YOUR NAME.

the direction; pause again; then say:

GOING TO ANSWER SOME QUESTIONS ABOUT

and possible answers aloud to the  
projecting the slides in order for each  
each question and allow ample time  
to mark their worksheets.

are finished, collect the worksheets.  
es 4-10 through 4-12 again, discussing  
ers with them. Encourage students  
After class, tally the students'

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-7

Students should:

--print their name.

--mark an X in the lower right-hand corner of their worksheet.

--circle the worksheet number.

--draw a box around their name.

--mark an X on the plant in answer to Question 1.

--mark Choice B in answer to Question 2.

--mark Choice B in answer to Question 3 after  
inferring that the number of fish in the pond  
will decrease as a result of a decreasing food  
supply.

--mark A and E in answer to Question 4 after  
inferring that the grass would grow taller with  
no rabbits to eat it and that the hawks would  
decrease since there are fewer rabbits to eat.

answers on Tallysheet 4-3. Consider whether the whole class needs further review or if a few individuals need special attention. Send in Tallysheet 4-3.

Then proceed to the next part.

Part II.

Instruct students to cut pictures of plants and animals that they believe are part of a food web out of the magazines you provide. It is important that you obtain sufficient magazines with appropriate plant and animal pictures. Several that would be excellent for this purpose are:

Ranger Rick, National Wildlife, International Wildlife  
all available from: National Wildlife Federation  
1412 - 16 Street, N.W.  
Washington, D. C. 20036

Audubon Magazine 950 - 3rd Avenue  
New York, New York 10022

Arizona Highways 2039 W. Louis Avenue  
Phoenix, Arizona 85009

and

National Geographic 17th and M Streets, N.W.  
Washington, D. C. 20036

Friends, other teachers, and students may be able to help in supplying copies of the above. Don't forget to seek out your school librarian, who may have back issues that can be cut up. Sports magazines (Outdoor Life, Field & Stream, etc.) available at most newsstands should also prove useful.

Have the students tape or paste pictures onto a large piece of butcher paper. After they have placed the

## TEACHING STRATEGIES

Tallysheet 4-3. Consider whether the whole class needs further review or if a few individuals need attention. Send in Tallysheet 4-3.

to the next part.

Students to cut pictures of plants and animals that they believe are part of a food web out of the magazines you provide. It is important that you obtain magazines with appropriate plant and animal pictures. Several that would be excellent for this

Book, National Wildlife, International Wildlife  
Available from: National Wildlife Federation  
1412 - 16 Street, N.W.  
Washington, D. C. 20036

Magazine 950 - 3rd Avenue  
New York, New York 10022

Highways 2039 W. Louis Avenue  
Phoenix, Arizona 85009

and

Geographic 17th and M Streets, N.W.  
Washington, D. C. 20036

For teachers, and students may be able to help find copies of the above. Don't forget to seek your school librarian, who may have back issues that are available. Sports magazines (Outdoor Life, Field & Stream) available at most newsstands should also

Students tape or paste pictures onto a large sheet of paper. After they have placed the

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

pictures on the paper, have them connect the plants and animals with arrows, using felt pens or crayons to show the relationships that exist.

When the food webs are complete, ask each student to display his food web and explain to the class the relationships he has drawn. Ask each student to explain how energy and materials are passed through the food web, and also to show how the disappearance of one kind of living thing might affect his food web.

As each student explains his food web, capitalize on the good things that are in the food web. You can use this activity as a gauge of your teaching success in Activities 4-1 through 4-6. The activity has achieved its purpose if all of your students made a reasonable food web and have shown basically accurate interrelationships. Evaluate in your own mind the posters that do not meet this minimal standard. Perhaps you will need to backtrack to make certain concepts clearer. Success will be determined by the ability of the students to explain material and energy flow and disruptions in their food web.

Display all the food webs somewhere in your room.

### Interpreting and Scoring:

Items 1 and 2: Assess the concept of transfer of energy in the food web. Students must draw conclusions from data presented. Additional work on food chains will be needed for those students who mark these answers wrong.





## TEACHING STRATEGIES

paper, have them connect the plants and  
ows, using felt pens or crayons to show  
s that exist.



WORK  
TIME

os are complete, ask each student to  
web and explain to the class the  
has drawn. Ask each student to explain  
aterials are passed through the food web,  
how the disappearance of one kind of  
it affect his food web.

explains his food web, capitalize on the  
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dard. Perhaps you will need to backtrack  
oncepts clearer. Success will be  
ability of the students to explain  
gy flow and disruptions in their food

ood webs somewhere in your room.

### Scoring:

ssess the concept of transfer of energy  
Students must draw conclusions from  
Additional work on food chains will be  
Students who mark these answers wrong.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-7

Students should:

--construct, individually, a pictorial food web.

Find the column marked Activity 4-7, Transfer of Energy, on the Concepts page of the Student Record of Progress. Circle YES if the student has answered both Questions One and Two correctly. Otherwise, circle NO.

Items 3 and 4: Assess the understanding of the inter-relationships between living things in the environment. These items assess a higher level of problem-solving skills, and answering one out of a possible three will indicate success.

Find the column marked Activity 4-7, Effects on Food Webs on the Problem-solving page of the Student Record of Progress. Circle YES if the student answered one of the three possibilities correctly. Otherwise, circle NO.

Turn to the Progress in Following Directions page of the Student Record of Progress.

Five directions were given to students:

1. to print their name in the space at the top of the paper
2. to print the date under their name
3. to mark an X in the lower right-hand corner of the worksheet
4. to circle the worksheet number
5. to draw a box around their name.

Circle YES if at least four directions were correctly followed. Circle NO if only one or none of the five directions were followed. Circle PART for the remaining students to indicate partial ability to follow directions

Turn to the Responsibility and Involvement page of

## TEACHING STRATEGIES

umn marked Activity 4-7, Transfer of Energy,  
ots page of the Student Record of Progress.  
f the student has answered both Questions  
correctly. Otherwise, circle NO.

4: Assess the understanding of the inter-  
s between living things in the environment.  
Assess a higher level of problem-solving  
answering one out of a possible three will  
cess.

umn marked Activity 4-7, Effects on Food Webs,  
em-solving page of the Student Record of  
ircle YES if the student answered one of  
ssibilities correctly. Otherwise, circle NO.

Progress in Following Directions page of  
Record of Progress.

ons were given to students:

at their name in the space at the top of the

at the date under their name

an X in the lower right-hand corner of  
ksheet

le the worksheet number

y a box around their name.

at least four directions were correctly  
rcle NO if only one or none of the five  
re followed. Circle PART for the remaining  
ndicate partial ability to follow directions.

esponsibility and Involvement page of

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

the Student Record of Progress. Using the guidelines, rate each student's involvement in science.

## TEACHING STRATEGIES

of Progress. Using the guidelines,  
s involvement in science.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-7

*Upon completion of this activity, each student should, as a minimum:*

- have completed Worksheet 4-3*
- have constructed a food web using pictures cut from magazines*
- have described his food web picture orally in terms of the plant and animal relationships shown.*

Activity name suggested by class: \_\_\_\_\_

Teacher \_\_\_\_\_

BSCS USE:	Post	Tally	Rev
	_____	_____	_____

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless

11. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

#### Specific Questions:

12. Did students have difficulty using worksheet 4-3? ☐ Yes ☐ No Comment:

13. Were appropriate pictures found in adequate numbers? ☐ Yes ☐ No Comment:

14. Were the students able to explain the food web relationships they drew?  
☐ Yes ☐ No Comment:

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.



B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

1. Was the background information for this core clear and useful? ☐ Yes ☐ No  
Comment:
2. Was there too much preparatory reading and too many directions given to the teacher? ☐ Yes ☐ No  
Comment:
3. Was it clear to you why these particular activities were chosen and the direction they were leading? ☐ Yes ☐ No
4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)
5. Is there a practical (take-home) value for your students in these activities?  
☐ Yes ☐ No If yes, what do you see as the "take-home" lesson? If no, what is needed?
6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?  
☐ Yes ☐ No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? ☐ Yes ☐ No  
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? ☐ Yes ☐ No  
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? ☐ Yes ☐ No  
Comment:

about the amount of reading and writing required of students. Should there be more or less in this core?

8. Were the Clues to Success and Student Record of Progress helpful in this core?  
☐ Yes    ☐ No    If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core?    ☐ Yes    ☐ No  
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials?    ☐ Yes    ☐ No  
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale?    ☐ Yes    ☐ No  
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

## NEW STUDENTS ENTERING DURING THIS CO

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Test
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white  
 B = black  
 S = Spanish-  
 American  
 O = other

W=White  
 B=Black  
 O=Other  
 (Na

## STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

NEW STUDENTS ENTERING DURING THIS CORE

Group	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				
O	M F			W B O				

W=WISC  
B=Binet  
O=Other  
(Name)

Reason for Dropping



## Me and my Environment

### UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

#### CORE B. DECOMPOSERS IN MY ENVIRONMENT

##### AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.

1. Develop an understanding of the relationship of the individual to the environment.
2. Develop an understanding of the relationship of the individual to the environment.
3. Recognize the role of the individual in the environment.
4. Realize that because of the environment, man uses the environment.
5. Comprehend the role of the individual in the environment.

1. Recognize the role of microorganisms in the environment.
2. Discover environmental problems caused by microorganisms.
3. Appreciate how knowledge of microorganisms can be used to solve environmental problems.
4. Conclude that microorganisms cause environmental problems for man.

UNIT IV. TRANSFER AND CYCLING OF  
MATERIALS IN MY ENVIRONMENT

CORE B. DECOMPOSERS IN  
MY ENVIRONMENT



BSCS

UNIT IV GOALS

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

CORE B OBJECTIVES

1. Recognize the role microbes play in the decomposition process.
2. Discover environmental requirements of microbes and other decomposers.
3. Appreciate how knowledge of decomposers can improve man's environment.
4. Conclude that microbes contribute to man's well-being as well as pose problems for man.



CORE B. DECOMPOSERS IN MY ENVIRONMENT

with a new component  
the important role  
environment.

Activity 4-8  
concept of scavenger  
usually applied to  
discarded by other  
decomposers, break  
animals that functi  
gull, crow, earthwo  
this activity becau  
the classroom. Sow  
bugs) are really s  
important function  
classroom is to re  
shelter, food, and  
Wonderland) is the

Activity 4-12  
human beings change  
experiment then fol  
(containing microbe  
to be developed is  
is due to living m  
"breathing" just as  
alive. The success  
indicator solution  
indicator is a sub  
by changing color.  
green or yellow col



# UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

## CORE B. DECOMPOSERS IN MY ENVIRONMENT



BSCS

with a new component -- decomposers -- to construct food cycles that show the important role of decomposers in cycling materials through the environment.

### BACKGROUND INFORMATION FOR THE TEACHER

Activity 4-8 (Starting to Round Up the Food Chain) introduces the concept of scavengers in the environment. The term "scavenger" is usually applied to an animal that feeds on dead or dying material often discarded by other living things. In this role they function as decomposers, breaking down complex materials to simpler ones. Some animals that function as scavengers are the opossum, hyena, rat, vulture, gull, crow, earthworm, ant, snail, and sow bug. The latter are used in this activity because of their wide distribution and ease of handling in the classroom. Sow bugs (some that roll into a ball are known as pill bugs) are really small land-dwelling crustaceans, and not insects. An important function served by the maintenance of pill bugs in the classroom is to reinforce the essential components of an environment: shelter, food, and water. Activity 4-9 (Pill Bug Paradise and Worm Wonderland) is the making of the pill bug or worm environment.

Activity 4-12 (Compost Microbes) uses a simple demonstration that human beings change the air they breathe (produce carbon dioxide). An experiment then follows that demonstrates that a sample of class compost (containing microbes) changes the air in a similar way. The conclusion to be developed is that the decomposition occurring in the compost pile is due to living microbes. Students are led to believe that microbes are "breathing" just as they themselves are, and therefore microbes are probably alive. The success of this activity depends upon the use of a chemical indicator solution to detect carbon dioxide dissolved in water. An indicator is a substance that shows the presence of a chemical substance by changing color. Bromthymol blue is an indicator that changes to a green or yellow color in the presence of an acid. Carbon dioxide (CO<sub>2</sub>)



## Me and my Environment

### UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

#### CORE B. DECOMPOSERS IN MY ENVIRONMENT

#### BACKGROUND INFORMATION FOR THE TEACHER (continued)

forms an acid when dissolved in water. Therefore, in this experiment, bromthymol blue can be used to indicate, indirectly, the presence of  $\text{CO}_2$ .

Activity 4-13 (Wet and Dry) provides a link between the concept of environmental requirements and the function of microbes as decomposers. An assortment of organic materials (mostly foodstuffs of plant origin) are subjected to wet and dry conditions. The samples exposed to moist storage will usually develop very obvious microbial (fungus) growth. The success of this activity depends on the careful choice of test materials: If beans, peas, or other seeds are used, be certain that they are intended for use as food and not seeds for gardening. Seeds prepared for planting usually are treated to prevent fungus growth. If bread is used, be sure that it contains no preservative (now a common ingredient) to prevent mold. The bread should be stale to begin with since fresh bread may contain enough moisture to support mold, even in a dry chamber. Be sure that selection of otherwise dry materials excludes salted and sugared products. Microbial growth in these materials will be inhibited by the salt or sugar solutions. In certain communities, the storage of hay for livestock feed may be of local importance. If so, use hay or straw for this sample. Hay is harvested in a green condition before the plant seeds mature.

Nutrients are therefore is a term applied to the for grain. These state less likely to develop

Activity 4-14 (Cold requirement theme established may be limited by a space that of refrigeration. requires no special procedure

Activity 4-15 (Storage store or to the school the variety of packaging directed toward the state preservation.

Activity 4-17 (A role of microbes. Part which man benefits directly Part II, the use of yeast of carbon dioxide production

Activity 4-18 (Role decomposers in the cycle

## UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

### CORE B. DECOMPOSERS IN MY ENVIRONMENT



BSCS

Nutrients are therefore retained with a greater likelihood of mold. Straw is a term applied to the stalks of a plant whose seeds have been harvested for grain. These stalks contain little or no residual nutrients and are less likely to develop microbial growth in a short time.

Activity 4-14 (Cool and Warm) is a variation of the habitat-requirement theme established earlier. The concept that microbial growth may be limited by a specific condition is expanded to another example, that of refrigeration. This is a straightforward experiment and requires no special precautions.

Activity 4-15 (Stor(ing) Problems) is a visit to a local grocery store or to the school cafeteria. Emphasis here should be placed on the variety of packaging and storage methods employed and should be directed toward the students' "real" world of food storage and preservation.

Activity 4-17 (A Real Gas) directs attention again to the positive role of microbes. Part I consists of a demonstration of fermentation in which man benefits directly from the products of microbial action. In Part II, the use of yeast in baking demonstrates the practical application of carbon dioxide production by microbes.

Activity 4-18 (Rounding Out the Food Chain) should make the role of decomposers in the cycling of materials more apparent.

is experiment,  
presence of CO<sub>2</sub>.

the concept of  
as decomposers.  
plant origin) are  
d to moist storage  
wth. The success  
aterials: If  
ey are intended  
ared for planting  
is used, be sure  
t) to prevent  
sh bread may contain  
Be sure that  
sugared products.  
the salt or sugar  
or livestock feed  
this sample. Hay  
mature.



# Me and my Environment

## UNIT IV. CORE B.

## PLANNING GUIDE


NOTE: Some activities (indicated in italics and an arrow) should be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Italics indicate materials to be prepared in advance)
	Materials You Furnish	Materials in Supply Kit	
4-8. Starting to Round up the Food Chain  Days needed: 1	35 mm Slide projector	Flash cards: Hawk Frog Mosquito Man Cow Grass Slide 4-14 Slide 4-15 Slide 4-16 Slide 4-17 Slide 4-18 Slide 4-19 Slide 4-20 Slide 4-21	Materials  Arrangements  Vulture Beetle Ant Anthill Rotting Board Board Microscope
4-9. Pill Bug Paradise and Worm Wonderland  Days needed: 1	Covered plastic shoe box or fish aquarium Pieces of potato and carrot Sponge Leaves Pill bugs Spade or fork Gallon jar Soil Sand Earthworms Lettuce Grass		One Small pie Small, tea Dried lea 25 to 50  Widemouth  About ten

# PLANNING GUIDE



**BSCS**

activities (indicated in *italics* and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a teaching and preparation schedule. All supplies needed are listed.

## of Supplies Needed

### Materials in Supply Kit

#### Flash cards:

Hawk  
Frog  
Mosquito  
Man  
Cow  
Grass  
Slide 4-14  
Slide 4-15  
Slide 4-16  
Slide 4-17  
Slide 4-18  
Slide 4-19  
Slide 4-20  
Slide 4-21

### Notes and Suggestions to Teacher

(*Italics and Arrow Indicate Advance Preparation Directions*)

*Materials for Activity 4-9 must be secured now.*

*Arrangements for field trip in Activity 4-15 should be made now.*

Vulture on carcass  
Beetle on carcass  
Ant close-up carrying food  
Anthill activity  
Rotting log  
Board  
Board turned over--sow bugs, slugs, etc.  
Microscopic decomposers

or

rot

One  
Small pieces  
Small, test tube plug  
Dried leaves  
25 to 50

Widemouthed


About ten



# Me and my Environment

## UNIT IV. CORE B.

## PLANNING GUIDE


NOTE: Some activities (indicated in *italics* and an  in the margin) require that you be prepared several days or weeks in advance. Use this guide to develop a teaching and preparation schedule. All supplies needed are listed in the table below.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Italics indicate supplies to be prepared in advance)
	Materials You Furnish	Materials in Supply Kit	
4-9. Pill Bug Paradise and Worm Wonderland (continued)	Cornmeal Black paper Tape		One sheet
4-10. Talking Rot  Days needed: 1	Compost piles	Worksheet 4-0 Equal-arm balance kits	From Activity Four
4-11. Planting in Compost  Days needed: 1-2	Compost piles Cleaned, 1/2-pint milk cartons Popsicle sticks or pieces of masking tape Felt pens Trowels Commercial planting soil	Peat pots Seeds: Marigold Bean	Class compost Two per student Two per student Several for class Several for class Two per student One package of
4-12. Compost Microbes  Days needed: 2	Compost Water	Flask, 250 ml, widemouthed Water pipe Rubber stopper, #8, one-hole Tygon tubing, 1/4-inch I.D., 12 inches long	From Activity One per pair One per student One per pair One per pair

# PLANNING GUIDE



BSCS

Activities (indicated in *italics* and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
	One sheet
Worksheet 4-0 Equal-arm balance kits	From Activity 4-0, partially completed  Four
Peat pots Seeds: Marigold Bean	Class compost piles from Activity 4-0  Two per student  Two per student Several for class use Several for class use  Two per student  One package of each per class
Flask, 250 ml, widemouthed Water pipe Rubber stopper, #8, one-hole Tygon tubing, 1/4-inch I.D., 12 inches long	From Activity 4-0  One per pair of students One per student One per pair of students  One per pair of students



# Me and my Environment

## UNIT IV. CORE B.

## PLANNING GUIDE

NOTE: Some activities (*indicated in italics and an arrow in the margin*) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies


Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Ital)
	Materials You Furnish	Materials in Supply Kit	
4-12. Compost Microbes (continued)		Acrylic tubing, 1/4-inch I.D., 3 inches long Carbon dioxide test solu- tion (bromthymol blue) Measuring spoons Beaker or baby food jar	One per p  In droppi One set p One per p
4-13. Wet and Dry  Days needed: 2	35 mm Slide projector Assorted dry foods  Masking tape Dark storage area	Slide 4-22 Worksheet 4-4 Plastic petri dishes with covers, 9 cm Filter paper discs, 7 cm Medicine dropper	Examples:  Such as a Worksheet Wet and D  Two per s Two per s One per s
4-14. Cool and Warm  Days needed: 1	35 mm Slide projector Ice chest or refrigerator Baby food jars or milk cartons Plastic kitchen wrap Food samples  Masking tape	Slide 4-23 Worksheet 4-5	Two per s One roll Provide f Worksheet Cool and For label



# PLANNING GUIDE



**BSCS**

activities (indicated in *italics* and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.


of Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p>Acrylic tubing, 1/4-inch I.D., 3 inches long</p> <p>Carbon dioxide test solution (bromthymol blue)</p> <p>Measuring spoons</p> <p>Beaker or baby food jar</p>	<p>One per pair of students</p> <p>In dropping bottles, one per pair of students</p> <p>One set per pair of students</p> <p>One per pair of students</p>
<p>Slide 4-22</p> <p>Worksheet 4-4</p> <p>Plastic petri dishes with covers, 9 cm</p> <p>Filter paper discs, 7 cm</p> <p>Medicine dropper</p>	<p>Examples: cornflakes, egg noodles, cornmeal, flour, tea, hay, beans (dried for cooking), peas (dried for cooking)</p> <p>Such as a cardboard carton, file drawer</p> <p>Worksheet 4-5</p> <p>Wet and Dry</p> <p>Two per student</p> <p>Two per student--paper towel may be used as a substitute</p> <p>One per student</p>
<p>Slide 4-23</p> <p>Worksheet 4-5</p>	<p>Two per student</p> <p>One roll</p> <p>Provide food samples usually refrigerated</p> <p>Worksheet 4-5</p> <p>Cool and Warm</p> <p>For labeling</p>



# Me and my Environment

## UNIT IV. CORE B.

## PLANNING GUIDE


NOTE: Some activities (indicated in *italics* and an  in the margin) should be prepared several days or weeks in advance. Use this as a teaching and preparation schedule. All supplies needed are listed in the table below.

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		<i>(Italics)</i>
	Materials You Furnish	Materials in Supply Kit	
4-15. Stor(ing) Problems  Days needed: 2	Cassette tape recorder Blank tapes		Optional Optional  <i>You should check the kit (at least one kit) for details.</i>
4-16. Clues to Success  Days needed: 2	35 mm Slide projector Groceries	Slide 4-24 Slide 4-25 Slide 4-26 Worksheet 4-6	At least 20 Question 1, C Question 2, C Question 3, C Clues to Success
4-17. A Real Gas  Days needed: 3	Dried yeast Large bowls Frozen grape juice (concentrated)  Granulated sugar Measuring spoons Bread pans Clean cloths Flour sifter Butter Flour (sifted all-purpose) Water		<i>Start classro for details.</i> Three packages Four  One can (Do not tives added) Several table Two sets Four Four Two 1/4 pound 8 cups 4 cups lukewarm

# PLANNING GUIDE



**BSCS**

activities (indicated in *italics* and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.


Supplies Needed	Notes and Suggestions to Teacher ( <i>Italics and Arrow Indicate Advance Preparation Directions</i> )
Materials in Supply Kit	
	<p>Optional Optional</p> <p><i>You should contact your local store manager well in advance (at least one week) before this activity. See activity for details.</i></p>
<p>Slide 4-24 Slide 4-25 Slide 4-26 Worksheet 4-6</p>	<p>At least 20 items of great variety Question 1, Clues to Success Question 2, Clues to Success Question 3, Clues to Success Clues to Success</p>
	<p><i>Start classroom collection of trash paper. See Activity 4-21 for details.</i> Three packages Four</p> <p>One can (Do not use nonconcentrated juice, which has preservatives added to prevent fermentation.) Several tablespoonsful Two sets Four Four Two 1/4 pound 8 cups 4 cups lukewarm</p>



## Me and my Environment

### UNIT IV. CORE B.

## PLANNING GUIDE


NOTE: Some activities (indicated in *italics* and an  in the margin) should be prepared several days or weeks in advance. Use this guide to develop a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Italics)
	Materials You Furnish	Materials in Supply Kit	
4-17. A Real Gas (continued)	Salt Shortening Pan	Flasks, 250 ml, widemouthed Rubber stopper, one-hole, #8 Tygon tubing, 18 inches long Acrylic tubing, 3 inches long Beakers, 400 ml Water pipes Carbon dioxide test solu- tion (bromthymol blue) Measuring cup	2 tables To grease Two, large Two Two Two pieces Two pieces Two Two
4-18. Rounding Out the Food Chain  Days needed: 1	Butcher paper Felt pens Masking tape 35 mm Slide projector	Food Chain Game cards Slide 4-27 Flash cards Decomposer flash cards Decomposer playing cards	Large piece One per  Four sets Pictures One deck One Four
4-19. Clues to Success  Days needed: 1	35 mm Slide projector	Worksheet 4-7 Slide 4-28 Slide 4-29 Slide 4-30	Review of Question Question Question Question

# PLANNING GUIDE



BSCS

activities (indicated in *italics* and an  in the margin) must be prepared several days or weeks in advance. Use this summary as a planning and preparation schedule. All supplies needed are listed.

of Supplies Needed	Notes and Suggestions to Teacher
Materials in Supply Kit	<i>(Italics and Arrow Indicate Advance Preparation Directions)</i>
<p>Flasks, 250 ml, widemouthed</p> <p>Rubber stopper, one-hole, #8</p> <p>Tygon tubing, 18 inches long</p> <p>Acrylic tubing, 3 inches long</p> <p>Beakers, 400 ml</p> <p>Water pipes</p> <p>Carbon dioxide test solution (bromthymol blue)</p> <p>Measuring cup</p>	<p>2 tablespoonsful</p> <p>To grease pan</p> <p>Two, large enough to set mixing bowls in</p> <p>Two</p> <p>Two</p> <p>Two pieces</p> <p>Two pieces, each 3 inches long</p> <p>Two</p> <p>Two</p> <p>Two</p>
<p>Food Chain Game cards</p> <p>Slide 4-27</p> <p>Flash cards</p> <p>Decomposer flash cards</p> <p>Decomposer playing cards</p>	<p>Large pieces, two pieces per team</p> <p>One per team</p> <p>Four sets</p> <p>Pictures depicting a cycle</p> <p>One deck</p> <p>One</p> <p>Four</p>
<p>Worksheet 4-7</p> <p>Slide 4-28</p> <p>Slide 4-29</p> <p>Slide 4-30</p>	<p>Review of Success</p> <p>Question 1, Clues to Success</p> <p>Question 2, Clues to Success</p> <p>Question 3, Clues to Success</p> <p>Question 4, Clues to Success</p>



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Observing, Describing

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task

#### PRACTICAL APPLICATION:

Practice in Verbal Expression, Increased  
Vocabulary, Interest in Animals in Their  
Environment

## ACTIVITY

### Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.

### AL THEME:

relationships of Environmental Components,  
Nature of Processes

### LLS:

ing, Describing

### IVING SKILLS:

g Question and Task

### APPLICATION:

ce in Verbal Expression, Increased  
lary, Interest in Animals in Their  
nment

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-8.

STARTING TO ROUND  
UP THE FOOD CHAIN



**BSCS**

ACTIVITY  
4-8

MATERIALS

Flash cards: Hawk  
Frog  
Mosquito  
Man  
Cow  
Grass

Slides 4-14 through 4-21

\*35 mm Slide projector

\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-8. Starting to Round Up the Food Chain

*This activity is designed as an introduction to the concepts of Core B. It is not intended that the aspects of the environment hinted at in the slides be pursued in any depth. Simply elicit preliminary discussion and pose the unifying questions.*

Place the six flash cards (listed in the materials column) in the chalk tray in front of the class so all students can see them.

Begin by asking:

WHO CAN ARRANGE THESE FLASH CARDS IN AN ORDER THAT SHOWS A FOOD CHAIN?

Select a volunteer who will arrange the flash cards in a logical order and explain his arrangement as he does so. When a reasonable food chain has been formed, write the names above the cards and connect them with arrows as you did in Core A.

HAWK → FROG → MOSQUITO → MAN → COW → GRASS

The focus of the next question sequence is on the two ends of the food chain. Start with the end the students can recall from Unit III by asking:

WHAT DOES GRASS EAT? WHAT DO PLANTS EAT?

If students do not know this, let them speculate and discuss what they think plants eat. It is not necessary that they have a specific answer at this point.



## TEACHING STRATEGIES

### Starting to Round Up the Food Chain

is designed as an introduction to the Core B. It is not intended that the aspects mentioned in the slides be pursued in detail. Simply elicit preliminary discussion and posing questions.

Use flash cards (listed in the materials) in the chalk tray in front of the class so all can see them.

ing:

ARRANGE THESE FLASH CARDS IN AN ORDER THAT SHOWS A FOOD CHAIN?

Volunteer who will arrange the flash cards in order and explain his arrangement as he does. When a reasonable food chain has been formed, write above the cards and connect them with arrows in Core A.

FROG → MOSQUITO → MAN → COW → GRASS

the next question sequence is on the two food chain. Start with the end the students from Unit III by asking:

DO GRASS EAT? WHAT DO PLANTS EAT?

If they do not know this, let them speculate and they think plants eat. It is not necessary to give a specific answer at this point.

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- view the introductory slide sequence (4-14 through 4-21) on decomposers
- participate in a preliminary discussion of decomposition
- define scavenger and decomposer
- contemplate the question, "Why aren't dead things piling up around us?"

Students should:

- recall their food chain work in Activity 4-1 and place the cards in a logical food chain.

- recall their work with plants and respond, "They don't eat," "The sun," "They make their own food."

## MATERIALS



Hawk



Frog



Mosquito



Man



Cow



Grass

## TEACHING STRATEGIES

After students have had time to discuss what plants eat, focus their attention on the other end of the food chain by asking:

WHAT EATS HAWKS?

The purpose of this question is to emphasize that in forming food chains, it seems that there is an end of the line. Of course there is no end of the line, but students have probably never thought about the continuation of the story. Therefore, the intent of this question is not to get an answer but rather to pose a question that students would probably not ask themselves. Continue to promote thinking by asking:

DOES SOMETHING HAVE TO EAT A HAWK? DOES THERE HAVE TO BE SOMETHING IN THE WORLD THAT EATS HAWKS?

Then ask:

DO HAWKS LIVE VERY LONG? DO THEY LIVE FOREVER?

WHAT HAPPENS TO DEAD HAWKS?

WHAT HAPPENS TO ANY ANIMAL WHEN IT DIES?

ARE THERE A LOT OF ANIMALS IN THE WORLD?

ARE A LOT OF THEM DYING EVERY DAY?

## TEACHING STRATEGIES

have had time to discuss what plants eat,  
mention on the other end of the food chain

AWKS?

his question is to emphasize that in  
ins, it seems that there is an end of  
urse there is no end of the line, but  
obably never thought about the continua-  
y. Therefore, the intent of this  
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ING HAVE TO EAT A HAWK? DOES THERE  
SOMETHING IN THE WORLD THAT EATS

VE VERY LONG? DO THEY LIVE FOREVER?

S TO DEAD HAWKS?

TO ANY ANIMAL WHEN IT DIES?

LOT OF ANIMALS IN THE WORLD?

THEM DYING EVERY DAY?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY

4-8

Students should:

--respond, "I don't know."

--speculate that there is probably something that  
eats hawks.

--conclude that they do not live forever and  
respond, "No."

--respond, "Stop flying," "Fall to the ground,"  
"Rot."

--relate their experiences with dead animals and  
say such things as, "Rot," "Turn color," "Get  
buried," "Stink," etc.

--respond, "Yes."

--respond, "Yes."

GIVE STUDENTS  
TIME  
TO  
THINK



ACTIVITY  
4-8

MATERIALS

TEACHING STRATEGIES

Ask the next three questions and anticipate a variety of student responses and answers. The student answer need not be corrected or modified at this point. The questions are meant only to be introductory in nature.

WHY DON'T WE SEE A LOT OF DEAD ANIMALS LYING AROUND ON THE GROUND?

WHAT HAPPENS TO DEAD ANIMALS?

WHY AREN'T DEAD ANIMALS PILING UP OUTSIDE?

LET'S LOOK AT SOME SLIDES THAT MIGHT GIVE US SOME CLUES.

Project Slide 4-14 and say:

WHAT DO YOU SEE IN THIS SLIDE?

Then ask:

WHAT DOES THE PICTURE TELL US HAPPENS TO SOME DEAD ANIMALS?

DOES ANYONE KNOW WHAT WE CALL THINGS THAT EAT OTHER DEAD THINGS?

Introduce the word scavenger to your students at this point by writing it on the chalkboard. Explain that this is the word we will use to describe animals that gather and eat things that are usually discarded by most other animals. Scavengers might be described as the junkmen of the natural world. Core C of this unit will deal with other aspects of the junk and junkmen of the world.

Slide 4-14



## TEACHING STRATEGIES

three questions and anticipate a variety of responses and answers. The student answer corrected or modified at this point. The question is meant only to be introductory in nature.

"DON'T WE SEE A LOT OF DEAD ANIMALS LYING ON THE GROUND?"

"WHAT HAPPENS TO DEAD ANIMALS?"

"DON'T DEAD ANIMALS PILING UP OUTSIDE?"

"LOOK AT SOME SLIDES THAT MIGHT GIVE US ANSWERS."

"Slide 4-14 and say:

"WHAT DO YOU SEE IN THIS SLIDE?"

"DOES THE PICTURE TELL US WHAT HAPPENS TO SOME ANIMALS?"

"DOES ANYONE KNOW WHAT WE CALL THINGS THAT EAT DEAD THINGS?"

"Add the word scavenger to your students at this time writing it on the chalkboard. Explain that this word we will use to describe animals that eat things that are usually discarded by other animals. Scavengers might be described as a part of the natural world. Core C of this unit deals with other aspects of the junk and junkmen

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "They don't live here," "We don't look for them," "I don't know."

--respond, "I don't know," "Something ate them."

--respond, "I don't know," "They rot away."

--describe the scene in their own words, pointing out the dead animal and the bird that is eating the dead animal.

--respond, "They get eaten by other animals."

--respond, "Cannibals," "I don't know."

## MATERIALS

Slide 4-15



Slide 4-16



Slide 4-17



## TEACHING STRATEGIES

After developing an initial understanding of the word scavenger and discussing the scene in Slide 4-14 for as long as students show interest, project Slide 4-15 and ask:

WHAT DO YOU SEE IN THIS PICTURE?

WHAT IS THE SCAVENGER IN THIS PICTURE?

WHAT DOES A SCAVENGER DO?

Now project Slide 4-16 and ask:

WHAT ANIMAL DO YOU SEE IN THIS PICTURE?

WHAT IS IT DOING?

WHAT WOULD YOU CALL HIM?

WHY?

Then project Slide 4-17 and ask:

WHAT DO WE SEE IN THIS PICTURE?

CAN AN ANT EAT A LOT OF DEAD THINGS?

WHY NOT?

CAN A WHOLE HILL OF ANTS EAT A LOT?

WHY?

WOULD ALL THE ANTS IN OUR CITY EAT A LOT OF DEAD THINGS?



## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY

4-8

Students should:

--respond, "A bug," "A beetle," "A scavenger that is eating on a dead body."

--respond, "The bug," "The beetle."

--respond, "Eats things that others usually do not."

--respond, "An ant."

--respond, "Carrying a big piece of food."

--respond, "A scavenger," "A worker."

--give a working definition of a scavenger and relate how an ant fits the definition.

--respond, "An anthill."

--respond, "No."

--respond, "It is too small."

--probably respond, "Yes."

--respond, "There are so many of them."

--infer, "Probably," "Yes," "I don't know."

an initial understanding of the word  
discussing the scene in Slide 4-14  
Students show interest, project Slide

SEE IN THIS PICTURE?

SCAVENGER IN THIS PICTURE?

SCAVENGER DO?

4-16 and ask:

DO YOU SEE IN THIS PICTURE?

DOING?

YOU CALL HIM?

4-17 and ask:

SEE IN THIS PICTURE?

AT A LOT OF DEAD THINGS?

HILL OF ANTS EAT A LOT?

E ANTS IN OUR CITY EAT A LOT OF

Slide 4-18



Slide 4-19



Slide 4-20



Project Slide 4-18 and ask:

WHAT DO YOU SEE HERE?

DOES ANYTHING EAT LOGS?

WHAT IS HAPPENING TO THE LOG?

WHAT IS CAUSING THE LOG TO CHANGE?

DO MOST ANIMALS EAT LOGS?

WHAT WOULD YOU CALL THESE "WORMS" AND "BUGS"  
THAT DO?

Now introduce the word "decompose" to your students and write it on the chalkboard. Explain that decompose means to break apart. Point out that as the worms and bugs eat the log, they break it apart, and we say it decomposes. Explain that in addition to calling some organisms scavengers, we might also refer to some of them as decomposers.

After introducing the word, project Slide 4-19 and ask:

WHAT DO YOU SEE IN THIS PICTURE?

IS IT BEING DECOMPOSED?

Project Slide 4-20 and say:

THIS SLIDE SHOWS A CLOSE-UP OF THE UNDERSIDE OF  
THE BOARD. HOW IS THIS DIFFERENT FROM WHAT YOU  
SAW IN THE LAST SLIDE?



## TEACHING STRATEGIES

Slide 4-18 and ask:

DO YOU SEE HERE?

ANYTHING EAT LOGS?

IS SOMETHING HAPPENING TO THE LOG?

IS SOMETHING CAUSING THE LOG TO CHANGE?

DO ANY ANIMALS EAT LOGS?

WOULD YOU CALL THESE "WORMS" AND "BUGS" DECOMPOSERS?

Introduce the word "decompose" to your students on the chalkboard. Explain that decompose means to break apart. Point out that as the worms eat the log, they break it apart, and we say it is decomposing. Explain that in addition to calling some animals scavengers, we might also refer to some of them as decomposers.

Introducing the word, project Slide 4-19 and ask:

DO YOU SEE IN THIS PICTURE?

IS IT BEING DECOMPOSED?

Slide 4-20 and say:

SLIDE SHOWS A CLOSE-UP OF THE UNDERSIDE OF THE LOG. HOW IS THIS DIFFERENT FROM WHAT YOU SAW IN THE LAST SLIDE?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "A log."

--express doubt that anything eats logs and respond, "No." Someone may say, "Termites do."

--respond, "It looks funny," "Rotten," "It's disappearing."

--infer, "Probably the worms and bugs," "It's rotting."

--respond, "No."

--respond, "Scavengers," "Termites."

--respond, "A board."

--respond, "No," "Doesn't look like it."

--observe and respond, "There are bugs on it," "It's rotten."

## MATERIALS

Slide 4-21



## TEACHING STRATEGIES

IS IT BEING DECOMPOSED?

WHAT DOES DECOMPOSE MEAN?

DO YOU SEE ANY SCAVENGERS IN THIS PICTURE?

Now project Slide 4-21 and say:

WHAT DO YOU SEE IN THIS PICTURE?

Point to the part of the picture identifying what is being viewed under the microscope and ask:

WHAT DO YOU SUPPOSE THESE THINGS ARE?

Then say:

EARLIER WE STUDIED SOME VERY SMALL LIVING THINGS THAT ARE TOO SMALL TO SEE WITHOUT A MICROSCOPE. WHAT DID WE CALL THEM?

If students do not recall the word "microbe," refer them back to one of the activities in Unit II involving microbes and ask what the tiny things were in the activity.

Then say:

MANY MICROBES BREAK THINGS APART BY EATING THEM. MICROBES THAT DO THIS ARE DECOMPOSERS.

CAN WE SEE ALL DECOMPOSERS?

## TEACHING STRATEGIES

ING DECOMPOSED?

DECOMPOSE MEAN?

ANY SCAVENGERS IN THIS PICTURE?

de 4-21 and say:

YOU SEE IN THIS PICTURE?

part of the picture identifying what is  
under the microscope and ask:

YOU SUPPOSE THESE THINGS ARE?

STUDIED SOME VERY SMALL LIVING  
THINGS ARE TOO SMALL TO SEE WITHOUT A  
MICROSCOPE. WHAT DID WE CALL THEM?

Do not recall the word "microbe," refer them  
to the activities in Unit II involving  
microbes and what the tiny things were in the

MICROBES BREAK THINGS APART BY EATING  
OTHER THINGS. THINGS THAT DO THIS ARE DECOMPOSERS.

WHAT ARE ALL DECOMPOSERS?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-8

Students should:

--respond, "Yes."

--give a reasonable definition of decomposers  
in their own words, such as, "To break apart,"  
"To rot."

--respond, "Yes," "The bugs," etc.

--observe the slide and describe the scene,  
identifying the person, the microscope, and  
something being viewed through the microscope.

--speculate about the nature of the microbes.  
They might guess scavengers or decomposers,  
"Bad microbes," "Germs that make people sick."

--recall "Microbes," "Germs."

--infer, "No," "They're too small."

**MATERIALS**

**TEACHING STRATEGIES**

Then say:

SOME DECOMPOSERS ARE LARGE AND SOME ARE SO  
SMALL WE CANNOT SEE THEM WITHOUT A MICROSCOPE.  
WE WILL BE STUDYING SOME OF THESE IN OUR NEXT  
ACTIVITIES.

Conclude by asking:

WHY AREN'T DEAD ANIMALS PILING UP ALL AROUND US?

WHO MIGHT EAT A DEAD HAWK?

Do not be concerned about an absolute answer here since  
it will be asked at the end of this core.

See Change of Pacer 10.

CHANG

## TEACHING STRATEGIES

DECOMPOSERS ARE LARGE AND SOME ARE SO  
WE CANNOT SEE THEM WITHOUT A MICROSCOPE.  
WE'LL BE STUDYING SOME OF THESE IN OUR NEXT  
LESSONS.

Asking:

AREN'T DEAD ANIMALS PILING UP ALL AROUND US?

SHOULD WE EAT A DEAD HAWK?

Concerned about an absolute answer here since  
asked at the end of this core.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Things are eating them," "They are  
being decomposed," "They're rotting away."

--respond, "Bugs," "Worms," "Ants," "Microbes."

*Upon completion of this activity, each student  
should, as a minimum:*

--describe in his own words a scavenger and a  
decomposer

--be able to say why dead animals aren't piling  
up.



CHANGE OF PACER

of Pacer 10.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_\_ Tally \_\_\_\_\_ Rev \_\_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST  
MODERATE INTEREST OR INDIFFERENCE  
RESISTANCE OR DISLIKE


6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
                   --keep as is                   revision suggested                   major changes described                   --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Did students understand why dead animals aren't piling up? ☐ Yes ☐ No Comment:

Did students understand that the role of scavengers is to break down dead things into parts that can be reused? ☐ No ☐ Yes

If yes, what evidence do you have of this understanding?

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:
- |                                     |  |  |                                    |
|-------------------------------------|--|--|------------------------------------|
| <input type="checkbox"/> Worthwhile | <input type="checkbox"/> Of value--needs the | <input type="checkbox"/> Worth salvaging--make | <input type="checkbox"/> Worthless |
| --keep as is                        | revision suggested                           | major changes described                        | --drop it                          |

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Did students understand why dead animals aren't piling up? ☐ Yes ☐ No Comment:
13. Did students understand that the role of scavengers is to break down dead things into parts that can be reused? ☐ No ☐ Yes  
If yes, what evidence do you have of this understanding?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?



B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

2. Discover environmental requirements of microbes and other decomposers.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Complementarity of Organisms and Environment,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Associating, Describing

#### PROBLEM-SOLVING SKILLS:

Experimenting

#### PRACTICAL APPLICATION

Caring for Another Classroom "Pet"

### Activity 4-9. Pill Bug Paradise and Worm Wonderland

*These activities will give students the opportunity to view some decomposers in action, while reinforcing the idea of the breakdown of organic matter. In addition,*

## ACTIVITY

### Goals for the Student:

- 1. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
- 2. Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

- 1. Discover environmental requirements of microbes and other decomposers.

### AL THEME:

Relationships of Environmental Components,  
Interdependency of Organisms and Environment,  
Nature of Processes

### ILLS:

ating, Describing

### IVING SKILLS:

menting

### PLICATION

for Another Classroom "Pet"

### 11 Bug Paradise and Worm Wonderland

will give students the opportunity to  
sers in action, while reinforcing the  
down of organic matter. In addition,

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-9.

PILL BUG PARADISE AND  
WORM WONDERLAND



BSCS

*During this activity, each student should:*

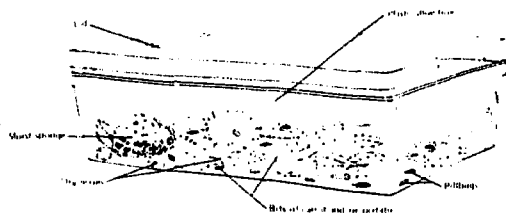
- assist in collecting pill bugs or earthworms
- participate in making a pill bug or worm environment

## ACTIVITY 4-9

### MATERIALS

- \*Pill bugs, 25 to 50
- \*Covered plastic shoe box or fish aquarium
- \*Leaves (dried)
- \*1 Small sponge (test tube plug)
- \*Pieces of potato and carrot

Diagram 4-4



\*Not furnished in materials kit

### TEACHING STRATEGIES

students will have some concrete experiences of caring for a living thing that they may not normally have contact with, or even be aware of. It is not necessary to complete both parts of this activity; having one sort of animal in the classroom will fulfill the objectives. However, students will probably be interested in both activities.

#### Part I. Pill Bug Paradise

##### Teacher Preparation:

Without pill bugs, this activity cannot be used. Fortunately, these land isopods are very common over much of the United States except during the coldest months of the year. They can be collected in most areas by searching under rocks, logs, old boards, in wood piles, near foundations of a house, etc., wherever they are shaded from the light and have adequate moisture.

Involve your students in collecting the bugs a day or two before you plan to begin the activity. The students can also assist in setting up the pill bug box as follows. (See Diagram 4-4.)

1. Scatter a handful of dead leaves or bark chips on the bottom of the shoe box. (A very thin layer of forest litter or the debris from a pile of firewood containing bits of wood and bark could be added first, but is not necessary.)
2. Add a small moistened sponge.
3. Add pill bugs.
4. Place a few small bits of carrot in and on the leaves.
5. Cover the box.

## TEACHING STRATEGIES

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g thing that they may not normally have con-  
or even be aware of. It is not necessary to  
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### ll Bug Paradise

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could be added first, but is not necessary.)

small moistened sponge.

ll bugs.

a few small bits of carrot in and on  
eaves.

the box.

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe and record changes in the pill bug or  
worm environment
- participate in the discussion of the pill bug  
or worm and its environment.

## MATERIALS

## TEACHING STRATEGIES

The bugs should do quite well under these conditions. Keep air circulation to a minimum and caution the students that the sponge must be kept moist or the pill bugs might die. It might be best to assign someone to moisten the sponge each day. Bits of carrots or potatoes could be added from time to time as they are consumed.

After the students have set up the pill bug box, mention to them that they will be expected to observe the activity of the pill bugs every day for a week. Some observable changes in the leaves indicating that they are being eaten should occur during this week. Holes will appear, and the leaves will eventually be consumed. No formal records will be kept for this activity since the compost activity will be going on at the same time. Simply allow students to have fun watching the pill bugs each day. Focus their attention on the dried leaves, carrots, and potatoes. Ask them to watch for



ABOUT 1 WEEK

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-9

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tion to a minimum and caution the  
e sponge must be kept moist or the  
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d be added from time to time as they



WORK  
TIME

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and potatoes. Ask them to watch for



WAITING TIME

ABOUT 1 WEEK LATER

**MATERIALS**

**TEACHING STRATEGIES**

any changes. When they have noted the changes discuss the results as follows:

WHAT HAS HAPPENED TO THE LEAVES?

WHAT HAS HAPPENED TO THE CARROTS AND POTATOES?

WHAT DO WE CALL ORGANISMS THAT BREAKDOWN THINGS LIKE THIS?

Accept decomposers and scavengers as the best answers and review these words if the students do not mention them. Write the words on the chalkboard.

WHAT ARE SOME OTHER DECOMPOSERS, OR SCAVENGERS?

If other decomposers and scavengers are not mentioned, remind them of Slides 4-14 through 4-21 in Activity 4-8.

The pill bug box can be dismantled at this time and the pill bugs released outside, or they may become another set of classroom pets that can be kept with minimal effort. Periodically add more leaves, small pieces of potato or carrot, and small amounts of moisture to their container.

Students may wish to set up their own individual pill bug cultures, using small containers such as baby food jars. Other kinds of organic matter could be added and observations made of the effect the pill bugs have on the material.



## TEACHING STRATEGIES

. When they have noted the changes discuss as follows:

AS HAPPENED TO THE LEAVES?

AS HAPPENED TO THE CARROTS AND POTATOES?

DO WE CALL ORGANISMS THAT BREAKDOWN THINGS THIS?

Decomposers and scavengers as the best answers these words if the students do not mention the words on the chalkboard.

ARE SOME OTHER DECOMPOSERS, OR SCAVENGERS?

Decomposers and scavengers are not mentioned, of Slides 4-14 through 4-21 in Activity 4-8.

The box can be dismantled at this time and the released outside, or they may become another group pets that can be kept with minimal care. Periodically add more leaves, small pieces of carrot, and small amounts of moisture to the box.

If they wish to set up their own individual pill boxes, using small containers such as baby food jars, kinds of organic matter could be added and the effect the pill bugs have on them.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "They have changed," "The pill bugs have eaten parts of them."

--indicate that these have been partially consumed also.

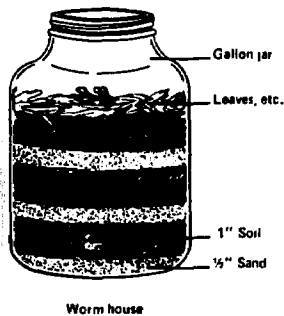
--respond, "Decomposers," "Scavengers."

--recall previous experiences, relate slides viewed earlier, and say, "Worms," "Microbes," "Fungi," "Ants," and so on.

## MATERIALS

- \*Spade or fork
- \*Widemouthed gallon jar
- \*Soil
- \*Sand
- \*Several earthworms (about 10)
- \*Decaying leaves
- \*Lettuce
- \*Grass
- \*Cornmeal
- \*Sheet of black paper
- \*Tape

Diagram 4-5



\*Not furnished in materials kit

## TEACHING STRATEGIES

### Part II. Worm Wonderland

#### Teacher Preparation

Worms can be collected in most places by digging in moist soil. In winter you will have to dig deeper than in summer. A gardener's compost pile may be a good source of worms.

Involve your students in collecting the worms before you plan to start the activity. The students can also set up the worm farm as follows:

1. Fill the gallon jar to within a few inches of the top with alternating layers of one inch of soil and one-half inch of sand. (See Diagram 4-5.) Finish with a layer of soil on top.
2. Place the worms and decaying leaves on the top.
3. Keep soil and sand moist but not too wet.
4. Wrap the black paper around the jar and tape in place. Leave this on for two weeks, removing only for observation.
5. Add small amounts of lettuce, grass, and cornmeal occasionally.

Have students observe the worm farm regularly. Some changes they should notice are: the soil and sand get mixed up together; leaves may disappear; bits of food get eaten.

After the students have observed changes, ask:

WHAT HAS HAPPENED TO THE LEAVES?

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-9

Students should:

Wonderland

tion

lected in most places by digging in  
winter you will have to dig deeper than  
gardener's compost pile may be a good

ndents in collecting the worms before you  
the activity. The students can also set  
as follows:

gallon jar to within a few inches of  
th alternating layers of one inch of  
one-half inch of sand. (See Diagram  
ish with a layer of soil on top.

worms and decaying leaves on the

and sand moist but not too wet.

black paper around the jar and  
face. Leave this on for two weeks,  
only for observation.

amounts of lettuce, grass, and  
occasionally.

serve the worm farm regularly. Some  
uld notice are: the soil and sand  
ether; leaves may disappear; bits of

ts have observed changes, ask:

PPENED TO THE LEAVES?

--respond, "Disappeared," "Worms have eaten them."

**MATERIALS**

**TEACHING STRATEGIES**

WHAT HAS HAPPENED TO THE (LETTUCE)?

WHAT DO WE CALL ORGANISMS THAT BREAK DOWN  
THINGS LIKE THIS?

Discuss with students the good earthworms do, breaking  
down dead material and aerating and mixing the soil.

See Change of Pacer 11.

CHANG

## TEACHING STRATEGIES

HAS HAPPENED TO THE (LETTUCE)?

DO WE CALL ORGANISMS THAT BREAK DOWN  
S LIKE THIS?

th students the good earthworms do, breaking  
material and aerating and mixing the soil.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Some is gone," "Eaten."

--respond, "Decomposers," "Scavengers."

*Upon completion of this activity, each student  
should, as a minimum:*

*--have observed a change in the decomposers'  
environment*

*--be able to state that the pill bugs or worms  
are decomposers, or scavengers.*



CHANGE OF PACER

of Pacer 11.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Did students recognize pill bugs as decomposers or scavengers? ☐ Yes ☐ No  
Comment:

BSCS Evaluation:

What was students' reaction to observing the pill bugs? Comment:

Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:
- |                                     |  |  |                                    |
|-------------------------------------|--|--|------------------------------------|
| <input type="checkbox"/> Worthwhile | <input type="checkbox"/> Of value--needs the | <input type="checkbox"/> Worth salvaging--make | <input type="checkbox"/> Worthless |
| --keep as is                        | revision suggested                           | major changes described                        | --drop it                          |

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

#### Specific Questions:

12. Did students recognize pill bugs as decomposers or scavengers? ☐ Yes ☐ No  
Comment:
13. What was students' reaction to observing the pill bugs? Comment:

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

Concern (or questions) about content:



B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
3. Appreciate how knowledge of decomposers can improve man's environment.
4. Conclude that microbes contribute to man's well-being as well as pose problems for man.

#### ENVIRONMENTAL THEME:

Interrelationship of Environmental Components,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Observing, Describing, Comparing

#### PROBLEM-SOLVING SKILLS:

Recording Data, Discussion and Treatment of  
Group Data

#### PRACTICAL APPLICATION:

Learning Gardening Skills, Value of Natural  
Fertilizers

## ACTIVITY

### Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
3. Appreciate how knowledge of decomposers can improve man's environment.
4. Conclude that microbes contribute to man's well-being as well as pose problems for man.

### AL THEME:

Relationship of Environmental Components,  
Nature of Processes

### ILLS:

ing, Describing, Comparing

### IVING SKILLS:

ing Data, Discussion and Treatment of  
Data

### PPPLICATION:

ing Gardening Skills, Value of Natural  
izers

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-10. TALKING ROT



BSCS

ACTIVITY  
4-10

MATERIALS

Compost piles  
Worksheet 4-0 (partially  
completed)  
Equal-arm balance kits

TEACHING STRATEGIES

Activity 4-10. Talking Rot

*This activity will conclude the observations of the compost piles set up in Activity 4-0. Students will have the opportunity to increase their understanding of decomposition and composting. These ideas should relate to man's ability to use his knowledge of decomposition to improve his environment; they should also relate to the student's ability to improve his own environment through a knowledge of decomposition.*

Begin this activity by having students observe the compost piles, including weighing the two objects, and make a final description on Worksheet 4-0. (REMINDER: Keep the compost and continue to add water as necessary as the compost will be used in Activities 4-11 and 4-12.) Discuss the changes that have occurred by saying:

LET'S LOOK AT OUR COMPOST RECORDS. HAS THE  
PILE CHANGED SINCE WE STARTED?

HOW HAS IT CHANGED?

HOW HAS THE (item) CHANGED?

Repeat this question for a number of the organic materials in the compost.

WHAT DOES THE WORD "DECOMPOSE" MEAN?

WHAT HAS BEEN MAKING THE THINGS IN OUR COMPOST  
PILE DECOMPOSE?

If students do not suggest microbes, ask:

CAN WE SEE THE DECOMPOSERS IN OUR  
COMPOST PILE?

## TEACHING STRATEGIES

### 0. Talking Rot

will conclude the observations of the compost set up in Activity 4-0. Students will have the opportunity to increase their understanding of decomposition and composting. These ideas should relate to the ability to use his knowledge of decomposition to improve his own environment through composting; they should also relate to the ability to improve his own environment through composting.

Activity by having students observe the compost, including weighing the two objects, and a description on Worksheet 4-0. (REMINDER: compost and continue to add water as necessary. It will be used in Activities 4-11 and 4-12.) changes that have occurred by saying:

LOOK AT OUR COMPOST RECORDS. HAS THE COMPOST CHANGED SINCE WE STARTED?

IT CHANGED?

THE (item) CHANGED?

question for a number of the organic materials in the compost.

WHAT DOES THE WORD "DECOMPOSE" MEAN?

HAS ANYONE BEEN MAKING THE THINGS IN OUR COMPOST COMPOST?

If students do not suggest microbes, ask:

DO WE SEE THE DECOMPOSERS IN OUR COMPOST PILE?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- define compost as a mixture of decaying materials
- relate the idea of composting to fertilizers and gardening
- associate decomposition of dead material with the soil-building process
- begin to develop a concept of biodegradability and nonbiodegradability.

Students should:

--examine Worksheet 4-0 and respond, "Yes."

--respond, "It stinks," "It's rotten."

--respond appropriately for each material.

--recall Activity 4-8 and respond, "To break apart," "Rot away."

--recall, "Scavengers," "Decomposers," "Microbes."

--respond, "No."

## MATERIALS

## TEACHING STRATEGIES

WHAT DO WE CALL LIVING THINGS THAT ARE  
TOO SMALL TO BE SEEN WITHOUT A MICROSCOPE?

WHERE DO THE MICROBES COME FROM THAT DECOMPOSE  
THE COMPOST HEAP?

WHY DO YOU THINK SOIL IS A GOOD PLACE TO PUT  
THINGS TO DECOMPOSE?

WHERE ARE THE THINGS GOING THAT ARE BEING  
DECOMPOSED BY THE MICROBES?

IF YOU ADD THINGS TO THE SOIL THAT DECOMPOSE,  
WHAT DOES THIS DO TO THE AMOUNT OF SOIL IN  
THE BOX?

DOES ANYONE KNOW ANYBODY WHO HAS A COMPOST  
PILE IN HIS YARD?

WHY DO YOU THINK PEOPLE WOULD BUILD COMPOST  
PILES?

If no one says yes or that they don't know why compost  
piles are built, tell them that compost piles are built  
to use in gardens as fertilizers. (If you invited a  
gardener or compost user to visit your class as a Change  
of Pacer, ask your students to recall the visit and what  
was said.)

WHY IS COMPOST ADDED TO GARDENS?

Tell the students that one of the reasons compost is  
added to the soil is to enrich and to fertilize it,  
and that composting helps the soil retain moisture.

## TEACHING STRATEGIES

WE CALL LIVING THINGS THAT ARE  
ALL TO BE SEEN WITHOUT A MICROSCOPE?

MICROBES COME FROM THAT DECOMPOSE  
HEAP?

HINK SOIL IS A GOOD PLACE TO PUT  
COMPOSE?

THE THINGS GOING THAT ARE BEING  
BY THE MICROBES?

THINGS TO THE SOIL THAT DECOMPOSE,  
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ST ADDED TO GARDENS?

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is to enrich and to fertilize it,  
ng helps the soil retain moisture.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-10

Students should:

--respond, "Microbes," "Germs."

--recall, "Microbes are everywhere," "In the  
soil already," etc.

--guess, "Lots of decomposing microbes."

--respond, "Into the soil," "Are rotting away."

--infer that it makes more soil.

--respond, "No," "Yes."

--respond, "To get rid of garbage," "Don't know,"  
"For fertilizer."

--respond, "Because it's like a fertilizer," "It  
helps the soil," "It makes the soil better."

MATERIALS

TEACHING STRATEGIES

WHAT DO YOU THINK HAPPENS TO THE BITS OF  
DECOMPOSED THINGS ONCE THEY ARE IN THE SOIL?

BITS OF DECOMPOSED LIVING THINGS ARE USED BY  
PLANTS TO HELP THEM GROW.

At this point you could refer to *The Long Journey*, and  
explain that microbes broke down the hawk's droppings  
before the body building material was used by the grass.

Direct the students' attention back to the compost pile  
and their completed worksheets.

WHAT THINGS HAVE DECOMPOSED OR ARE DECOMPOSING?

WHY ARE THE GLASS AND PLASTIC THE SAME AS WHEN  
WE PUT THEM IN OUR COMPOST?

WE SAY THAT THINGS THAT CAN BE BROKEN DOWN  
BY DECOMPOSING MICROBES ARE BIODEGRADABLE.

Write the word "biodegradable" on the chalkboard.

HOW MANY OF YOU HAVE EVER HEARD THE WORD  
"BIODEGRADABLE" BEFORE?

WHERE HAVE YOU SEEN THIS WORD BEFORE?

WHAT THINGS IN OUR COMPOST PILE WERE  
BIODEGRADABLE, WERE DECOMPOSED BY MICROBES?

WHAT THINGS IN OUR COMPOST PILE WERE NOT  
DECOMPOSED BY MICROBES?



## TEACHING STRATEGIES

DO YOU THINK HAPPENS TO THE BITS OF  
POSED THINGS ONCE THEY ARE IN THE SOIL?

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COMPOSING MICROBES ARE BIODEGRADABLE.

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NY OF YOU HAVE EVER HEARD THE WORD  
GRADABLE" BEFORE?

HAVE YOU SEEN THIS WORD BEFORE?

THINGS IN OUR COMPOST PILE WERE  
RADABLE, WERE DECOMPOSED BY MICROBES?

THINGS IN OUR COMPOST PILE WERE NOT  
POSED BY MICROBES?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--guess, "Used by plants," "Eaten by  
microbes," "Nothing," etc.

--after inspecting their worksheets and the pile,  
indicate those things that are undergoing  
decomposition.

--respond, "They didn't break down," "Microbes  
can't eat them," "They're too hard."

--raise their hands.

--suggest such places as on TV, on soap or  
detergent boxes.

--recall, "Orange peel," "Grass," etc.

--recall, "Plastic," "Glass," etc.

## MATERIALS

## TEACHING STRATEGIES

WE CALL THESE THINGS NONBIODEGRADABLE.

Write the word "nonbiodegradable" on the chalkboard.

DO THINGS THAT DECOMPOSE OR THINGS THAT DON'T  
DECOMPOSE DO MORE GOOD TO THE SOIL?

TOMORROW WE WILL USE OUR COMPOST TO GROW  
PLANTS, AND THEN WE WILL SEE IF THE THINGS  
THAT DECOMPOSED MADE THE SOIL RICH.

Collect all student copies of Worksheet 4-0.

Turn to the Development of Experience in Observation page of the Student Record of Progress and use the worksheets to rate each student's success in making appropriate observations. Recalling the amount of assistance you provided, also rate whether each student could record results on his own, required help, or made no meaningful record. Plan to provide special help to your least successful students as they complete the worksheets in Activities 4-13 and 4-14. Send Worksheet 4-0 and a copy of your ratings to BSCS.

## TEACHING STRATEGIES

SE THINGS NONBIODEGRADABLE.

nonbiodegradable" on the chalkboard.

HAT DECOMPOSE OR THINGS THAT DON'T  
O MORE GOOD TO THE SOIL?

WILL USE OUR COMPOST TO GROW  
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al record. Plan to provide special  
st successful students as they complete  
n Activities 4-13 and 4-14. Send  
a copy of your ratings to BSCS.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-10

Students should:

--infer that things that decompose make the  
soil richer.

*Upon completion of this activity, each student  
should, as a minimum:*

- be able to state that some things are broken  
down in compost piles by decomposers*
- be able to state that some things are not  
decomposed*
- be able to say that microbes decompose things  
in the compost piles.*

ACTIVITY  
4-10

**MATERIALS**

**TEACHING STRATEGIES**

See Change of Pacers 12 and 13.

CHAN

ACTIVITY  
4-10

**MATERIALS**

**TEACHING STRATEGIES**

*See*  
**CHAN**

See Change of Pacers 12 and 13.

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS



CHANGE OF PACER

of Pacers 12 and 13.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST  
MODERATE INTEREST OR INDIFFERENCE  
RESISTANCE OR DISLIKE


6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. How many students realized that compost is fertilizer? ☐ None ☐ 1/4 ☐ 1/2  
☐ 3/4 ☐ All Evidence for this judgment:

How many students had heard the word "biodegradable" before?

None ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ All Comment:

Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:
- |                                     |  |  |                                    |
|-------------------------------------|--|--|------------------------------------|
| <input type="checkbox"/> Worthwhile | <input type="checkbox"/> Of value--needs the | <input type="checkbox"/> Worth salvaging--make | <input type="checkbox"/> Worthless |
| --keep as is                        | revision suggested                           | major changes described                        | --drop it                          |

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

#### Specific Questions:

12. How many students realized that compost is fertilizer? ☐ None ☐ 1/4 ☐ 1/2  
☐ 3/4 ☐ All Evidence for this judgment:
13. How many students had heard the word "biodegradable" before?  
None ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ All Comment:
14. Before mailing in this feedback sheet, ask each student what the word "biodegradable" means. How many could give some indication of its relation to decomposers? ☐ None ☐ 1/4 ☐ 1/2 ☐ 3/4 ☐ All Comment:



Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
3. Appreciate how knowledge of decomposers can improve man's environment.
4. Conclude that microbes contribute to man's well-being as well as pose problems for man.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Observing, Applying

#### PROBLEM-SOLVING SKILLS:

Experimenting

#### PRACTICAL APPLICATION

Learning Garden Skills, Practice in  
Following Directions

## CTIVITY

### Goals for the Student:

- Develop an understanding of cycling and appreciate the cycling relationship of materials and organisms in the environment.
- Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

- Recognize the role microbes play in the decomposition process.
- Appreciate how knowledge of decomposers can improve man's environment.
- Conclude that microbes contribute to man's well-being as well as pose problems for man.

### AL THEME:

Relationships of Environmental Components,  
Nature of Processes

### LLS:

ing, Applying

### ING SKILLS:

menting

### PLICATION

ing Garden Skills, Practice in  
ing Directions

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-11. PLANTING IN COMPOST



BSCS

## MATERIALS

Seeds, 1 package each of:

Marigolds

Beans

2 Peat pots per student

\*Compost piles from Activity 4-0

\*Commercial planting soil

\*2 Cleaned 1/2-pint milk cartons  
per student

\*2 Popsicle sticks or pieces of  
masking tape per student

\*3 Marking pencils

\*Trowels, several

\*Not furnished in materials kit

## TEACHING STRATEGIES

### Activity 4-11. Planting in Compost

*The concrete experience of planting seeds in compost in this activity reinforces the idea that decomposed materials enrich the soil and help plants to grow.*

#### Teacher Preparation:

1. This activity requires compost that has been well decomposed. If your compost piles have not been set up long enough, this activity could be postponed to the end of Core B.
2. If students enjoy planting the seeds, they might wish to try other sorts of seeds. One suggestion is the sensitive plant, but it is rather delicate and may not be as successful as marigolds and beans.
3. Be sure to leave enough compost for three tablespoons per pair of students for Activity 4-12.

Begin by saying:

WHAT HAPPENED TO THE GRASS AND PEELINGS WE  
PUT IN OUR COMPOST PILE?

WHAT BROKE DOWN THESE THINGS?

WHAT HAPPENED TO THE BITS OF PEELINGS AFTER  
THEY WERE BROKEN DOWN?

HOW DO THESE PIECES HELP THE GRASS AND OTHER  
PLANTS GROWING IN THE SOIL?

SINCE BITS OF THE COMPOST THAT WERE PART OF  
LIVING THINGS ARE BEING USED BY PLANTS, IT  
IS BEING USED OVER AGAIN.

## TEACHING STRATEGIES

### Planting in Compost

experience of planting seeds in compost in reinforces the idea that decomposed rich the soil and help plants to grow.

#### ration:

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#### ng:

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OUR COMPOST PILE?

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OPENED TO THE BITS OF PEELINGS AFTER  
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HESE PIECES HELP THE GRASS AND OTHER  
ROWING IN THE SOIL?

TS OF THE COMPOST THAT WERE PART OF  
HINGS ARE BEING USED BY PLANTS, IT  
USED OVER AGAIN.

## ANTICIPATED STUDENT BEHAVIORS

*During this activity, each student should:*

- review the concepts involved in compost
- plant two sorts of seeds in compost from their piles.

Students should:

--recall, "Decomposed," "Rotted," etc.

--recall, "Microbes," "Decomposers."

--recall, "Went into the soil."

--reply, "It fertilizes them," "Helps them to grow," "Plants use them to make food."

## MATERIALS

## TEACHING STRATEGIES

WHAT IS A WORD THAT MEANS TO USE OVER AGAIN?

WHICH OF THE THINGS WE ADDED TO THE SOIL COULD BE RECYCLED BY PLANTS?

WE ARE GOING TO RECYCLE OUR COMPOST TODAY. HOW CAN WE DO THIS?

WE ARE GOING TO PLANT SEEDS IN OUR COMPOST TO MAKE A MINIGARDEN.

Display the materials to be used for planting. It is suggested that each student plant two different kinds of seeds; two seeds of one kind in each peat pot. Each student will then have two pots and two different kinds of plants. Have the students proceed as follows:

1. Distribute two peat pots and two cleaned, recycled milk cartons to each student.
2. Fill each pot at least three-fourths full with compost. (If there is not enough compost to fill each pot, add natural or potting soil to provide a mixture of one-half soil, one-half compost, pointing out to the students that mixing compost with soil is normally the way compost is used in gardening. Save at least three tablespoons full of moist compost for Activity 4-12. If compost is left over, use this to plant any remaining seeds.)
3. Place one pot in each milk carton. The carton will catch any excess water used in keeping the seedlings moist.
4. Give each student two Popsicle sticks or pieces of masking tape to use as labels.

## TEACHING STRATEGIES

WORD THAT MEANS TO USE OVER AGAIN?

THINGS WE ADDED TO THE SOIL COULD  
BY PLANTS?

TO RECYCLE OUR COMPOST TODAY. HOW  
IS?

TO PLANT SEEDS IN OUR COMPOST TO  
GARDEN.

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ny excess water used in keeping the  
ist.

udent two Popsicle sticks or pieces  
ape to use as labels.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-11

Students should:

--recall, "Recycle."

--respond with the things that decomposed, e.g.,  
grass, peelings.

--infer, "By planting something."



**MATERIALS**

**TEACHING STRATEGIES**

5. After the pots are filled, distribute two of one kind of seed to each student.
6. Use a Popsicle stick or pencil and make two holes in the compost in one of the pots. The proper planting depth for the seeds used is:  
Marigold, one-fourth inch  
Bean, one inch
7. Place a seed in each hole and loosely pack the compost over the seeds.
8. Water the pot thoroughly, pouring away any water that has soaked through the pot into the milk carton.
9. Write the student's name and the name of the plant on a Popsicle stick or on masking tape and attach it to the pot. (Write the name of the plant seeds on the chalkboard for the students to copy.)
10. Repeat the same procedure with a second kind of seed.

One advantage of the peat pots used in this activity is that the students can put the whole pot, including the plant, in the soil and will not have to transplant the plant. If the student does not plan to plant the pot in his yard, it should eventually be planted in a larger clay pot.

The plants planted in the remaining class compost will need to be replanted later. The sensitive plant grows best in a humid environment. Keep these plants as moist as possible at all times.

## TEACHING STRATEGIES

the pots are filled, distribute two of one seed to each student.

Popsicle stick or pencil and make two holes in the compost in one of the pots. The planting depth for the seeds used is:   
Brigol, one-fourth inch   
Bean, one inch

Put a seed in each hole and loosely pack the compost over the seeds.

Water the pot thoroughly, pouring away any water that has soaked through the pot into the milk can.

Write the student's name and the name of the plant on a Popsicle stick or on masking tape and attach it to the pot. (Write the name of the seeds on the chalkboard for the students to refer to.)

Repeat the same procedure with a second kind of seed.

One of the peat pots used in this activity is made of peat. Students can put the whole pot, including the soil, and will not have to transplant the plants. If the student does not plan to plant the pot, it should eventually be planted in a larger pot.

Plants started in the remaining class compost will be replanted later. The sensitive plant grows best in a humid environment. Keep these plants as warm as possible at all times.

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

Ask:

HOW WILL THE COMPOST HELP THE SEEDS TO GROW?

See Change of Pacer 13.

CHANGE OF

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-11

DO COMPOST HELP THE SEEDS TO GROW?

Students should:

--respond, "By fertilizing the soil," "It makes the dirt richer," "It helps the soil."

Upon completion of this activity, each student should, as a minimum:

--be able to state that things in the compost from the decomposed materials will help their seeds grow.



er 13.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Did any students have difficulty planting seeds? ☐ No ☐ Yes How many? \_\_\_\_\_  
Explain:

How did different students react to handling decomposed material for planting?  
Comment:

Do students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
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Explain:
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Comment:

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

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C. Concern (or questions) about content:

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Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?





## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
2. Discover environmental requirements of microbes and other decomposers.

#### ENVIRONMENTAL THEME:

Interrelationship of Environmental Components,  
Complementarity of Organisms and Environment,  
Cyclic Nature of Processes, Finiteness of  
Resources

#### INQUIRY SKILLS:

Inferring

#### PROBLEM-SOLVING SKILLS:

Controls, Interpreting Results

#### PRACTICAL APPLICATION:

Learning to Make Compost, Motor Coordination

## CTIVITY

### Goals for the Student:

- Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
- Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

- Recognize the role microbes play in the decomposition process.
- Discover environmental requirements of microbes and other decomposers.

### AL THEME:

Relationship of Environmental Components,  
Interdependency of Organisms and Environment,  
Nature of Processes, Finiteness of  
Resources

### LS:

Learning

### ING SKILLS:

Skills, Interpreting Results

### PLICATION:

Ability to Make Compost, Motor Coordination

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-12. COMPOST MICROBES



BSCS

ACTIVITY  
4-12

MATERIALS

- 1 Water pipe per student
- 1 Flask, 250 ml, widemouthed,  
per pair of students
- 1 Rubber stopper, No. 8, one-  
hole, per pair of students
- 1 one-fourth inch I.D. Tygon  
tubing, 12 inches long, per pair  
of students
- 1 one-fourth inch I.D. Acrylic  
tubing, 3 inches long, per pair  
of students
- 1 Carbon dioxide test solution  
(bromthymol blue) in dropping  
bottles, per pair of students
- 1 Beaker or baby food jar per  
pair of students
- 1 Measuring spoon per pair of  
students

\*Compost from Activity 4-0

\*Water

furnished in materials kit

TEACHING STRATEGIES

Activity 4-12. Compost Microbes

*This activity will demonstrate one way that microbes are similar to other living things. It will reinforce the idea that microbes are living organisms and that decomposition occurs through microbial action. In this case the class compost will be the resource of microbial activity.*

Teacher Preparation:

Part I.

The success of the rest of this activity depends on the use of a chemical test solution to detect carbon dioxide dissolved in water. A test solution indicates the presence of a certain chemical substance by changing color. Bromthymol blue is a test solution that changes to pale green or yellow in the presence of carbon dioxide.

DO THINGS DECOMPOSE ALL BY THEMSELVES?

WHAT HELPS THINGS DECOMPOSE IN OUR COMPOST PILE?

ARE MICROBES ALIVE?

DO MICROBES BREATHE AS WE DO?

PEOPLE BREATHE OUT A GAS CALLED CARBON DIOXIDE.  
DO YOU THINK MICROBES BREATHE OUT CARBON DIOXIDE,  
TOO?

## TEACHING STRATEGIES

### 2. Compost Microbes

It will demonstrate one way that microbes  
to other living things. It will reinforce  
microbes are living organisms and that  
it occurs through microbial action. In this  
compost will be the resource of microbial

### Explanation:

of the rest of this activity depends on the  
chemical test solution to detect carbon dioxide  
in water. A test solution indicates the pre-  
sence of a certain chemical substance by changing color.  
The test solution is a test solution that changes to pale  
yellow in the presence of carbon dioxide.

DO MICROBES DECOMPOSE ALL BY THEMSELVES?

DOES ANYTHING DECOMPOSE IN OUR COMPOST PILE?

ARE MICROBES ALIVE?

DO MICROBES BREATHE AS WE DO?

MICROBES BREATHE OUT A GAS CALLED CARBON DIOXIDE.  
DO MICROBES BREATHE OUT CARBON DIOXIDE,

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- fill and label a water pipe vial with indicator solution
- exhale and inhale into the indicator solution through a tube
- observe the change in color of the indicator solution
- associate the change in indicator solution with the presence of carbon dioxide
- infer that carbon dioxide is a normal component of exhaled breath
- observe a color change in the indicator solution made by air from the compost
- infer that microbes in compost produce carbon dioxide
- infer that microbes are living organisms.

Students should:

--respond, "No," "They have to be in a compost pile," "Microbes do it."

--respond, "Microbes."

--respond, "Yes," "No," "I don't know."

--respond, "I don't know," "No," "Yes."

--predict whether or not microbes breathe out carbon dioxide.

## MATERIALS

## TEACHING STRATEGIES

HOW COULD WE FIND OUT IF THE MICROBES PRODUCE CARBON DIOXIDE, TOO?

Discuss the student suggestions for such an experiment. Point out that the class has equipment to do one sort of experiment.

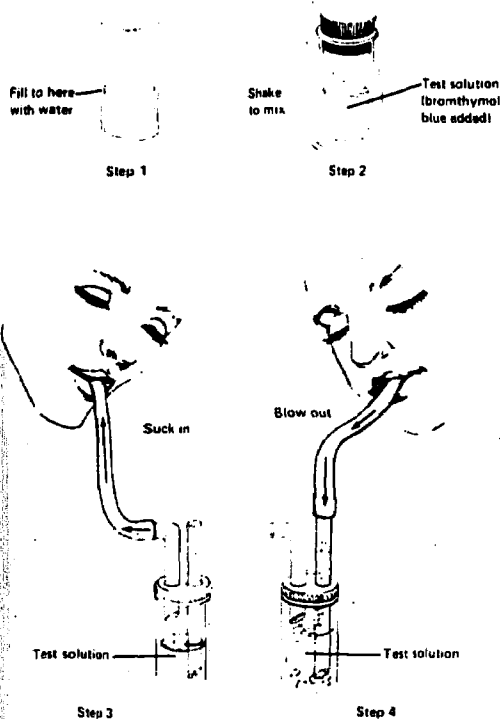
Distribute the materials and direct each student as follows:

1. Fill a water pipe with water up to the mark. Using a medicine dropper, add five to ten drops of the test solution (bromthymol blue) to the water. (See Diagram 4-6.)
2. Swirl the contents gently to mix. Cap the water pipe.
3. Explain that the test solution will change color (blue to pale yellow or green) when there is carbon dioxide present. Tell the students that in order to see how the test solution works they will use it on their own breath first.
4. Attach the flexible tubing to the straight tube that runs below the surface of the test solution. Instruct the students to blow bubbles gently into the solution. In a few moments the solution should change from blue to yellow, indicating the presence of carbon dioxide given off in human breath.

Ask:

DID THE INDICATOR SOLUTION CHANGE COLOR?

Diagram 4-6



## TEACHING STRATEGIES

FIND OUT IF THE MICROBES PRODUCE  
DE, TOO?

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en off in human breath.

GATOR SOLUTION CHANGE COLOR?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY

4-12

Students should:

--respond, "Put a bunch in a jar and see if  
the blue goes away," "Put some solution on  
some rotting stuff."

--respond, "Yes, the blue disappears."

DOES THE AIR WE BREATHE OUT HAVE MUCH CARBON DIOXIDE IN IT?

HOW DO YOU KNOW?

To demonstrate that little or no carbon dioxide is present in the air we breathe in, connect a twelve-inch piece of flexible tubing to the short bent tube. Have the student draw the outside air through the solution by sucking on the tubing much as he would a straw. The solution should not change color.

After the experiment is completed continue by asking:

DID THE TEST SOLUTION CHANGE COLOR?

DOES THE AIR WE BREATHE IN HAVE MUCH CARBON DIOXIDE IN IT?

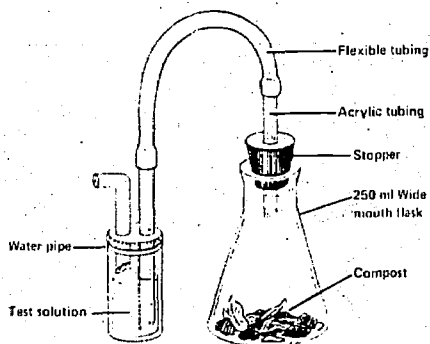
HOW DO YOU KNOW?

WE HAVE SEEN HOW THE CARBON DIOXIDE TEST SOLUTION WORKS. NOW LET'S FIND OUT IF MICROBES BREATHE AND IF THEIR BREATH WILL MAKE THE TEST SOLUTION CHANGE COLOR.

Assign students to work in pairs and distribute flasks and tubing. Direct the students to assemble the equipment as follows. (See Diagram 4-7.)

1. Transfer about three heaping tablespoons of moist compost left from the planting exercise to a widemouthed flask. Be sure the compost is rich in organic matter.

Diagram 4-7



## TEACHING STRATEGIES

THE AIR WE BREATHE OUT HAVE MUCH CARBON  
E IN IT?

YOU KNOW?

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we breathe in, connect a twelve-inch piece of  
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h in organic matter.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--infer that because of the color change it  
does, and respond, "Yes."

--explain, "Color changes so there must be a  
lot of it."

--respond, "No."

--respond, "No."

--recall the explanation and respond, "The  
blue color didn't change."



## MATERIALS

## TEACHING STRATEGIES

2. Insert the three-inch piece of acrylic tubing into the hole in the large rubber stopper. The tubing need only be inserted a short distance into the stopper.
3. Before placing the stopper in the flask, attach one end of the flexible tubing to the piece of tube in the stopper. Attach the other end to the straight tube of the water pipe that protrudes below the surface of the test solution.
4. Place the water pipe in something so it will stand up (beaker or baby food jar).
5. Put together, or have a student put together, an identical setup, but with no compost. This will serve as a control for the class experiments.

As each separate instruction is given, have each group complete the task before proceeding further. The entire experiment should run about twenty-four hours, although a weekend would be more satisfactory. The normal respiration due to the microbial decomposition of the organic compost should produce plenty of carbon dioxide. As the gas bubbles produced pass through the solution, it will turn from blue to pale yellow. The control, without compost, will not be undergoing decomposition and will, therefore, not cause a color change.

### Part II.

At the beginning of the next class period, allow the students to observe the changes that have occurred.

Begin by having the students recall what they did the previous day.

Ask:

WHAT DID YOUR BREATH DO TO THE TEST SOLUTION?

## TEACHING STRATEGIES

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hole in the large rubber stopper. The  
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## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-12

Students should:

--recall that it turned the solution yellow.

**MATERIALS**

**TEACHING STRATEGIES**

DID YOU NOTICE ANY CHANGE IN THE TEST SOLUTION  
IN THE FLASK WITH THE COMPOST?

WHAT DOES THE COLOR CHANGE TELL US ABOUT THE  
COMPOST?

IS COMPOST ALIVE?

ARE THERE ANY LIVING THINGS IN THE COMPOST?

WHAT DO THE MICROBES GIVE OFF WHILE THEY ARE  
LIVING IN THE COMPOST?

HOW DO YOU KNOW THAT THE MICROBES GIVE OFF  
CARBON DIOXIDE?

Now direct the students' attention to the control setup  
and say:

THIS IS THE CONTROL. WHAT IS DIFFERENT ABOUT  
THIS FLASK?

WAS THERE ANY CHANGE IN THE TEST SOLUTION OF  
THE EMPTY FLASK?

WHY DO YOU SUPPOSE THERE WAS NO CHANGE?

DO YOU THINK THE MICROBES IN THE COMPOST ARE  
ALIVE?

WHY?

## TEACHING STRATEGIES

DO YOU NOTICE ANY CHANGE IN THE TEST SOLUTION  
IN THE FLASK WITH THE COMPOST?

DOES THE COLOR CHANGE TELL US ABOUT THE  
TEST?

ARE THEY STILL POST ALIVE?

ARE THERE ANY LIVING THINGS IN THE COMPOST?

DO THE MICROBES GIVE OFF WHILE THEY ARE  
IN THE COMPOST?

DO YOU KNOW THAT THE MICROBES GIVE OFF  
CARBON DIOXIDE?

Did the students' attention to the control setup

DIFFER FROM THE CONTROL. WHAT IS DIFFERENT ABOUT  
THE TEST FLASK?

DO YOU NOTICE ANY CHANGE IN THE TEST SOLUTION OF  
THE EMPTY FLASK?

DO YOU SUPPOSE THERE WAS NO CHANGE?

DO YOU THINK THE MICROBES IN THE COMPOST ARE

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "It turned yellow," "Blue color is  
gone," "Carbon dioxide was in the flask."

--respond, "The bubbles are carbon dioxide,"  
"Microbes must breathe, too."

--respond, "No."

--recall that microbes are in compost.

--respond, "The microbes give off carbon dioxide,"  
"They breathe carbon dioxide."

--indicate that the test solution changed color.

--respond, "No compost in it," "One is empty."

--respond, "No."

--respond, "No microbes in the empty jar," "No  
microbes were breathing."

--respond, "Yes."

--respond, "Made the color change," "They breathe."

## MATERIALS

## TEACHING STRATEGIES

WHAT ARE THE THINGS WE HAVE LEARNED THAT  
MICROBES DO THAT MIGHT MAKE YOU THINK THEY  
ARE ALIVE?

See Change of Pacer 14.

CHANGE OF P

## TEACHING STRATEGIES

THE THINGS WE HAVE LEARNED THAT  
THAT MIGHT MAKE YOU THINK THEY

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-12

Students should:

- respond, "They die if they have nothing to eat," "They make carbon dioxide in compost," "They breathe," "They eat."

*Upon completion of this activity, each student should, as a minimum:*

- change carbon dioxide test solution from blue to yellow by blowing bubbles into it
- participate in carrying out the compost experiment
- describe orally the changes that took place in test solutions when used with the compost and with the control.



CHANGE OF PACER

ter 14.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_\_ Tally \_\_\_\_\_ Rev \_\_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST  
MODERATE INTEREST OR INDIFFERENCE  
RESISTANCE OR DISLIKE


6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
                   --keep as is                   revision suggested                   major changes described                   --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. Did the compost change the color of test solution? ☐ No ☐ Yes: The color changed from \_\_\_\_\_ to \_\_\_\_\_ Comment:

7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

#### Specific Questions:

12. Did the compost change the color of test solution? ☐ No ☐ Yes: The color changed from \_\_\_\_\_ to \_\_\_\_\_ Comment:

13. Did students associate the presence of carbon dioxide with living microbes? ☐ No ☐ Yes How many? \_\_\_\_\_ Comment:



Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
2. Discover environmental requirements of microbes and other decomposers.

#### ENVIRONMENTAL THEME:

Interrelationship of Environmental Components,  
Complementarity of Organisms and Environment,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Observing, Associating, Describing, Comparing

#### PROBLEM-SOLVING SKILLS:

Experimenting, Identifying Variables,  
Identifying Controls, Interpreting Results

#### PRACTICAL APPLICATION:

Working in a Group, Learning Food Storage  
Procedures

## ACTIVITY

### Goals for the Student:

- Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
- Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

- Recognize the role microbes play in the decomposition process.
- Discover environmental requirements of microbes and other decomposers.

### AL THEME:

Relationship of Environmental Components,  
Interdependency of Organisms and Environment,  
Nature of Processes

### ILLS:

ing, Associating, Describing, Comparing

### IVING SKILLS:

menting, Identifying Variables,  
ifying Controls, Interpreting Results

### APPLICATION:

g in a Group, Learning Food Storage  
ures

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-13. WET AND DRY



**BSCS**

MATERIALS

- 2 Plastic petri dishes with covers per student, 9 cm
- 2 Filter paper discs per student, 7 cm (paper toweling may be used as a substitute)
- 1 Medicine dropper per student
- Worksheet 4-4
- Slide 4-22
- \*Assorted dry foods such as:
  - Corn flakes
  - Egg noodles
  - Oat flakes
  - Flour
  - Cornmeal
  - Tea
  - Hay
  - Beans, dried for cooking
  - Peas, dried for cooking
- \*Cardboard carton, file drawer, or other dark storage place
- \*35 mm Slide projector
- \*Masking tape

\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-13. Wet and Dry

*This activity will demonstrate that moisture is an essential component of a good environment for decomposers.*

Teacher Preparation:

Put the assorted dry materials into beakers. Label each beaker.

If the class has completed Activity 4-9 and observed the pill bugs, begin by asking:

WHAT DID WE PUT INTO THE PILL BUG BOX?

WHY DO YOU SUPPOSE WE PUT IN THE LEAVES?

WHY DID WE PUT IN THE WET SPONGE?

If the pill bug activity (4-9) has not been done, reference should be made to the compost pile in Activity 4-0.

Point to the class compost pile and say:

WOULD OUR COMPOST DECOMPOSE IF THE PILE WERE COMPLETELY DRY?

## TEACHING STRATEGIES

### 13. Wet and Dry

ny will demonstrate that moisture is an  
component of a good environment for decomposers.

#### Preparation:

orted dry materials into beakers. Label each

has completed Activity 4-9 and observed the  
begin by asking:

AND WE PUT INTO THE PILL BUG BOX?

YOU SUPPOSE WE PUT IN THE LEAVES?

WE PUT IN THE WET SPONGE?

bug activity (4-9) has not been done, refer-  
be made to the compost pile in Activity 4-0.

class compost pile and say:

OUR COMPOST DECOMPOSE IF THE PILE WERE  
ELY DRY?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- prepare a petri dish with filter paper inside
- select a sample material for testing
- use a medicine dropper to moisten filter paper
- compare microbe growth in moist and dry dishes
- infer that microbes require some special conditions for growth
- infer that the absence of a required condition may prevent growth of some microbes
- associate certain food packaging with prevention of spoilage.

Students should:

- respond, "Soil," "Leaves," "Wet sponge," "Pill bugs."
- respond, "For food," "For bugs to eat."
- respond, "For water," "So the bugs wouldn't die."
- guess, "Yes," "No," "Don't know."

## MATERIALS

## TEACHING STRATEGIES

DO YOU THINK THAT THE MICROBES IN THE COMPOST PILE NEED MOISTURE?

Discuss the idea that, in addition to a place to live (shelter), most organisms require food and moisture. Ask:

DO WE NEED WATER TO STAY ALIVE?

Display the labeled beakers containing the assorted dry materials you have selected and ask:

WHAT ARE THESE THINGS?

ARE THEY WET OR DRY?

WHAT WOULD HAPPEN TO THESE DRY THINGS IF THEY GOT WET?

DOES IT MATTER IF DRY FOODS GET WET?

TODAY WE ARE GOING TO FIND OUT IF IT MAKES ANY DIFFERENCE IF THINGS ARE WET OR DRY.

Allow each student to select a small amount (about seven or eight particles) of one food material to be tested. Write on the chalkboard what each student selects. Accept duplications as long as a wide variety of materials is tested by the class.

ACCEPT  
ANSWER

## TEACHING STRATEGIES

WHAT THE MICROBES IN THE COMPOST  
DISTURB?

that, in addition to a place to live  
organisms require food and moisture.

WATER TO STAY ALIVE?

ed beakers containing the assorted dry  
e selected and ask:

SE THINGS?

OR DRY?

APPEN TO THESE DRY THINGS IF  
?

ER IF DRY FOODS GET WET?

  
**ACCEPT ALL  
ANSWERS**

GOING TO FIND OUT IF IT MAKES  
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t to select a small amount (about seven  
s) of one food material to be tested.  
kboard what each student selects.  
ns as long as a wide variety of materials  
class.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-13

Students should:

--respond, "Yes," "Maybe," "Don't know."

--respond, "Yes."

--respond, "Food," "Things we eat."

--respond, "Dry."

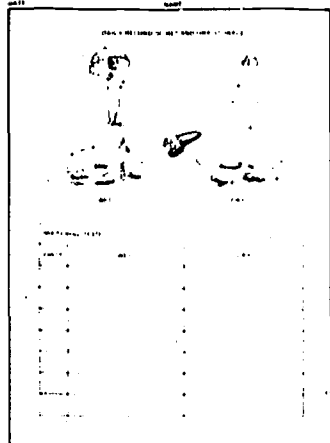
--make various guesses such as, "Spoil," "Get  
soggy," "Be messy."

--relay experiences and guesses.

--choose a food to be tested.



Slide 4-22



Now project Slide 4-22 (Worksheet 4-4) and indicate to the students where to write the name of the material they are testing.

Say:

WHAT DO WE CALL THE THINGS YOU HAVE SELECTED?

WOULD YOU DESCRIBE THEM AS WET OR DRY?

Distribute the following testing materials to each student:

- Two plastic petri dishes with covers
- Two filter paper discs
- One medicine dropper

Have the students test their materials as follows:

1. Place a filter paper disc or circular piece of paper toweling in the bottom of each petri dish.
2. Place a sample of the dry food material to be tested (three or four cereal flakes, three or four beans, one-eighth teaspoon tea, etc.) in each dish.
3. Moisten the filter paper in one of the dishes with a full medicine dropper of water. The paper in the matching dish should remain dry.
4. Replace the covers on all dishes.

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

Students should:

### SELECTION TIME

Slide 4-22 (Worksheet 4-4) and indicate to students where to write the name of the material being tested.

DO WE CALL THE THINGS YOU HAVE SELECTED?

DO YOU DESCRIBE THEM AS WET OR DRY?

Place the following testing materials to each

plastic petri dishes with covers  
filter paper discs  
medicine dropper

Students test their materials as follows:

Place a filter paper disc or circular piece of towel in the bottom of each petri dish.

Place a sample of the dry food material to be tested (three or four cereal flakes, three or four beans, one-eighth teaspoon tea, etc.) in each dish.

Place the filter paper in one of the dishes with the medicine dropper of water. The paper in the other dish should remain dry.

Place the covers on all dishes.

--respond "Food."

--respond, "Dry."

## MATERIALS

## TEACHING STRATEGIES

5. Using masking tape, label wet or dry, the name of the material, the student's initials and date. Attach appropriate label to petri dishes.



Then ask:

WHY DID WE SET UP TWO DISHES FOR EACH MATERIAL?

To reinforce the idea of a control, ask:

WHAT ARE WE TRYING TO FIND OUT ABOUT THESE DRY FOOD MATERIALS?

HOW WILL WE KNOW IF THE FOOD CHANGES WHEN WATER IS ADDED TO IT?

HOW WILL WE KNOW IF THE WET FOOD LOOKS DIFFERENT THAN DRY FOOD?

The assembled dishes should be placed in a dark, dry place. Each day until fungus appears allow time for students to retrieve their dishes and worksheets, note any changes that have occurred, and record the appearance of the food on their worksheets. The experiment may be terminated as soon as fungus growth is well developed by using the discussion strategy on the following page. While the experiment continues, you may proceed with the next activity, returning to the worksheets each day to record observations.

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-13

Students should:

--set up experimental petri dishes.



WORK  
TIME

SET UP TWO DISHES FOR EACH MATERIAL?

idea of a control, ask:

TRYING TO FIND OUT ABOUT THESE DRY  
ALS?

KNOW IF THE FOOD CHANGES WHEN WATER  
IT?

KNOW IF THE WET FOOD LOOKS DIFFERENT  
OD?

shes should be placed in a dark, dry  
until fungus appears allow time for  
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have occurred, and record the appearance  
their worksheets. The experiment may be  
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sion strategy on the following page.  
ment continues, you may proceed with the  
returning to the worksheets each day to  
ons.

--respond, "To see what will happen to the food left  
dry and with water added.

--respond, "See what happens when dry foods get  
wet," "To see if they rot."

--predict, "It will look different," "It will  
rot," "It will stink."

--respond, "Compare it to the dry," "Look at the  
two dishes."

## TEACHING STRATEGIES

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SET UP TWO DISHES FOR EACH MATERIAL?

idea of a control, ask:

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## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-13

Students should:

--set up experimental petri dishes.



--respond, "To see what will happen to the food left  
dry and with water added."

--respond, "See what happens when dry foods get  
wet," "To see if they rot."

--predict, "It will look different," "It will  
rot," "It will stink."

--respond, "Compare it to the dry," "Look at the  
two dishes."

As observations are made, help the students to realize how valuable the dry dish is for comparison with the wet dish. Also help them verbalize and write the differences on their worksheets. Direct students to read what they have recorded.

After the experiment has continued long enough for all students to have noticed and recorded changes in the wet food, use the following strategy for discussion.

Ask:

LOOK AT YOUR WORKSHEETS. ON THE (date) WHAT HAPPENED TO OUR DRIED FOOD WHEN WE MADE IT WET?

Using different days, encourage students to read from their worksheets. You may wish to compare the number of days it took different foods to mold and the appearance of different things. Allow time for students to view each other's dishes.

Ask:

WHEN DID (item) START TO DECOMPOSE?

WHAT CAUSED THE FOOD TO GET MOLDY AND DECOMPOSE?

If students do not answer this, ask:

WHY DIDN'T THE DRY FOOD GET MOLDY AND DECOMPOSE?

Remind students that the only difference between the dishes was that one had water and the other didn't and, therefore, wetness is a condition necessary for the mold to grow.

## TEACHING STRATEGIES

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experiment has continued long enough for all to have noticed and recorded changes in the use the following strategy for discussion.

AT YOUR WORKSHEETS. ON THE (date) WHAT NED TO OUR DRIED FOOD WHEN WE MADE IT WET?

erent days, encourage students to read from sheets. You may wish to compare the number took different foods to mold and the appear- fferent things. Allow time for students to other's dishes.

DID (item) START TO DECOMPOSE?

CAUSED THE FOOD TO GET MOLDY AND DECOMPOSE?

If students do not answer this, ask:

WHY DIDN'T THE DRY FOOD GET MOLDY AND DECOMPOSE?

Remind students that the only difference between the dishes was that one had water and the other didn't and, therefore, wetness is a condition necessary for the mold to grow.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--examine their results on specific dates, and state, "They molded," "They got gushy," "They got soggy."

--respond, "The second day," "The third day," "The fifth day."

--respond, "The water."

--respond, "No water," "Not wet."

## MATERIALS

## TEACHING STRATEGIES

WHAT DO YOU SUPPOSE NEEDS THE WATER?

WHAT ELSE DID WE LOOK AT RECENTLY THAT NEEDED WATER?

DO DEAD THINGS NEED WATER?

ARE MOLDS ALIVE?

Review briefly the kinds of foods that have been tested.

Then ask:

HOW ARE THESE FOODS USUALLY STORED AT HOME OR AT THE GROCERY STORE?

WHAT KIND OF PACKAGES DO THEY USUALLY COME IN?

WHAT DOES WATER DO TO FOODS THAT ARE NORMALLY DRY?

Collect Worksheet 4-4. After class, turn to the Development of Experience in Observation page of the Student Record of Progress and use the worksheets to rate each student's success in making appropriate observations and recording them. Then send the worksheets and a copy of your ratings to BSCS.



## TEACHING STRATEGIES

SUPPOSE NEEDS THE WATER?

WOULD WE LOOK AT RECENTLY THAT NEEDED

INGS NEED WATER?

LIVE?

he kinds of foods that have been tested.

SE FOODS USUALLY STORED AT HOME OR  
ERY STORE?

F PACKAGES DO THEY USUALLY COME IN?

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em. Then send the worksheets and a copy  
to BSCS.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-13

Students should:

--respond, "The molds," "The microbes," "The  
decomposers."

--recall, "Pill bugs," "Compost."

--probably say, "No."

--probably say, "Yes," or be perplexed.

--respond, "In dry places."

--respond with appropriate answers that relate to  
dryness and air tightness.

--respond, "Makes it moldy," "Spoils it."

*Upon completion of this activity, each student  
should, as a minimum:*

--have added food materials to petri dishes under  
wet and dry conditions

--have observed the wet and dry foods for several  
days

--have recorded observations on Worksheet 4-4.



8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

**Specific Questions:**

12. Did students have difficulty recording observations on Worksheet 4-4?  
☐ No ☐ Yes Comment:
13. Did students understand the idea of control? ☐ No ☐ Yes How many? \_\_\_\_\_  
How did they express the idea?
14. Did students associate the mold with moisture? ☐ Yes ☐ No Comment:

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
2. Discover environmental requirements of microbes and other decomposers.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Complementarity of Organisms and Environment

#### INQUIRY SKILLS:

Observing, Associating, Describing, Comparing

#### PROBLEM-SOLVING SKILLS:

Experimenting, Identifying Variables,  
Identifying Controls, Interpreting Results

#### PRACTICAL APPLICATION:

Learn Proper Food Storage Procedures

## ACTIVITY

### Goals for the Student:

- Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
- Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

- Recognize the role microbes play in the decomposition process.
- Discover environmental requirements of microbes and other decomposers.

### AL THEME:

Relationships of Environmental Components,  
Interdependency of Organisms and Environment

### ILLS:

ing, Associating, Describing, Comparing

### IVING SKILLS:

menting, Identifying Variables,  
fying Controls, Interpreting Results

### PLICATION:

Proper Food Storage Procedures

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-14. COOL AND WARM



BSCS

## MATERIALS

Slide 4-23

Worksheet 4-5

- \*Ice chest or refrigerator
- \*2 Baby food jars or milk cartons per student
- \*Plastic kitchen wrap
- \*Food samples usually refrigerated
- \*Masking tape for labeling
- \*35 mm Slide projector

\*Not furnished in materials kit

## TEACHING STRATEGIES

### Activity 4-14. Cool and Warm

*In this activity students will again associate microbes with the spoilage of food. The concept of refrigerating certain foods to prevent their spoilage will become apparent. Results will vary depending on what foods the students bring in. Capitalize on the variety of results to illustrate that refrigeration is more critical with some foods than with others.*

### Teacher Preparation:

Bring to class several samples of foods that normally require refrigeration such as milk, fresh meats, cottage cheese, and so forth. You may wish to have the students bring samples from home. Bring enough yourself so there are sure to be sufficient foods on hand to perform the activity.

Begin by asking:

IN WHAT KINDS OF PLACES DO MICROBES GROW BEST?

HOW CAN WE STORE FOODS TO KEEP THEM FROM DECOMPOSING?

If the students do not recall this, ask:

WHAT DID WE LEARN ABOUT STORING FOODS IN OUR LAST ACTIVITY?

Continue by asking:

CAN ALL FOODS BE STORED DRY?

WHICH ONES CANNOT BE STORED DRY?



## TEACHING STRATEGIES

### 14. Cool and Warm

Activity students will again associate microbes with spoilage of food. The concept of refrigerating foods to prevent their spoilage will become clearer. Results will vary depending on what foods they bring in. Capitalize on the variety of results to show that refrigeration is more critical with some than with others.

### Preparation:

Class several samples of foods that normally require refrigeration such as milk, fresh meats, cottage cheese, etc. so forth. You may wish to have the students bring foods from home. Bring enough yourself so there will be sufficient foods on hand to perform the activity.

### During:

1. WHAT KINDS OF PLACES DO MICROBES GROW BEST?

2. HOW DO WE STORE FOODS TO KEEP THEM FROM SPOILING?

If the students do not recall this, ask:

3. WHAT DID WE LEARN ABOUT STORING FOODS IN OUR LAST ACTIVITY?

### After:

1. WHICH FOODS BE STORED DRY?

2. WHICH CANNOT BE STORED DRY?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- state reasons for refrigerating certain foods
- divide selected food samples in half, placing both portions in properly labeled containers
- place one portion of each sample in a refrigerator, the other in the classroom
- observe both samples for a week and record daily observations on Worksheet 4-5
- infer that spoilage is decomposition and is caused by microbes
- conclude that refrigeration reduces decomposition and spoilage of some foods.

Students should:

--recall that microbes grow in wet places.

--recall that keeping foods dry is a proper storage method.

--respond, "Keep them dry."

--respond, "No."

--respond, "Milk," "Coke," "Catsup," and so forth.

## MATERIALS

## TEACHING STRATEGIES

Hold up the food samples one at a time and ask:

WHAT IS THIS FOOD?

WHERE IS item USUALLY STORED?

WHY?

After students have identified the foods, ask:

WHAT WOULD HAPPEN IF YOU DID NOT KEEP THESE  
FOODS IN THE REFRIGERATOR?

LET'S SEE WHAT HAPPENS IF WE LEAVE PART OF  
THESE FOODS OUT OF THE REFRIGERATOR.

Allow each student to select a food to test. Have students divide their food in half in whatever way is appropriate for the food they have chosen.

Put each half into a jar or milk carton and label with the student's name and either "cold" or "warm." Have the students cover the containers with plastic kitchen wrap and place one container in the refrigerator or cooler and the other in the classroom in a warm, dark place.

Do not keep this experiment in the same place as the "wet-dry" foods. Separate and label these experiments physically in the room so students do not get them confused.

Have the students observe both containers each day for the next week.

## TEACHING STRATEGIES

samples one at a time and ask:

IS FOOD?

item) USUALLY STORED?

Have identified the foods, ask:

HAPPEN IF YOU DID NOT KEEP THESE  
E REFRIGERATOR?

HAT HAPPENS IF WE LEAVE PART OF  
OUT OF THE REFRIGERATOR.

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ne container in the refrigerator or  
ther in the classroom in a warm, dark

experiment in the same place as the  
Separate and label these experiments  
e room so students do not get them

s observe both containers each day for

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-14

Students should:

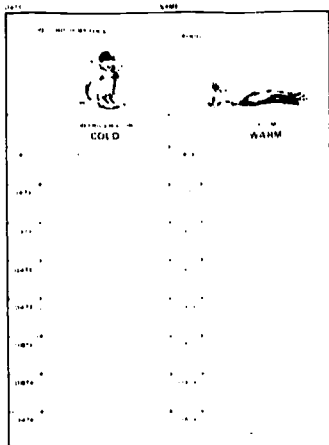
--identify the food.

--respond, "In the refrigerator."

--state reasons for keeping them refrigerated:  
"Keeps it cold," "Keeps it from rotting,"  
"Don't know."

--respond, "I don't know," "Melt," "Rot," "Get  
smelly."

Slide 4-23, Worksheet 4-5



Have the students record their observations each day on Worksheet 4-5. Project Slide 4-23 and point to the cold and warm columns. So that the students will know how to record on the worksheet properly, select a student to come to the front and write his observations in the appropriate space on the projected slide. Encourage students to keep good records of the kinds of changes mentioned above. Assist them in their verbalization and writing of the results on their worksheets.

If your students have difficulty writing their observations, ask them to describe what they see while you write the appropriate descriptive terms on the chalkboard. Students can then copy the words on their worksheets.

Many interesting changes should take place, including the growth of beautiful molds. In addition, smells will develop that are not so beautiful. Changes in texture and color will accompany the other changes. The foods at room temperature should spoil, mold, and change much more quickly than the refrigerated ones. Draw attention to these changes by asking questions such as:

HOW ARE THE FOODS IN THE TWO DISHES DIFFERENT?

WHY?

RECORD

2-

When the results are obviously different (in about two to five days), ask:

## TEACHING STRATEGIES

Students record their observations each day on Slide 6. Project Slide 4-23 and point to the cold columns. So that the students will know how to use the worksheet properly, select a student to come to the front and write his observations in the space on the projected slide. Encourage students to keep good records of the kinds of changes that take place. Assist them in their verbalization and in recording the results on their worksheets.

Students have difficulty writing their observations. Help them to describe what they see while you write appropriate descriptive terms on the chalkboard. Then copy the words on their worksheets.

Changes that should take place, including the appearance of beautiful molds. In addition, smells will be present but are not so beautiful. Changes in texture will accompany the other changes. The foods at room temperature should spoil, mold, and change much more rapidly than the refrigerated ones. Draw attention to these changes by asking questions such as:

THE FOODS IN THE TWO DISHES DIFFERENT?

RECORD RESULTS  
2-5 DAYS

Results are obviously different (in about two days), ask:

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--describe the appearance of the food in the two dishes: "They have white stuff on them," "They look fuzzy," "One's a different color."

--speculate about why the foods are different.

## MATERIALS

## TEACHING STRATEGIES

(Student's name), WHAT FOOD HAVE YOU BEEN OBSERVING?

WHAT DIFFERENCES HAVE YOU NOTICED BETWEEN THE TWO SAMPLES?

If the student has difficulty describing the differences, help him to refer to the worksheet and the daily changes he has written.

After several students have had an opportunity to describe their foods, ask:

WHAT HAPPENS TO MOST FOODS IF WE TAKE THEM OUT OF THE REFRIGERATOR AND LEAVE THEM OUT?

WHAT CAUSES THEM TO SPOIL?

SHOULD WE EAT SPOILED FOOD?

WHY NOT?

WHY SHOULD WE KEEP FOODS IN THE REFRIGERATOR?

WHY DO YOU THINK THAT REFRIGERATION KEEPS FOOD FROM SPOILING?

Conclude by asking:

LET'S SEE HOW MANY FOODS WE CAN LIST THAT SHOULD BE KEPT IN THE REFRIGERATOR.

## TEACHING STRATEGIES

(name), WHAT FOOD HAVE YOU BEEN

RENCES HAVE YOU NOTICED BETWEEN THE

as difficulty describing the differences,  
to the worksheet and the daily changes

udents have had an opportunity to describe

S TO MOST FOODS IF WE TAKE THEM OUT  
REFRIGERATOR AND LEAVE THEM OUT?

THEM TO SPOIL?

AT SPOILED FOOD?

WE KEEP FOODS IN THE REFRIGERATOR?

THINK THAT REFRIGERATION KEEPS FOOD  
NG?

ng:

OW MANY FOODS WE CAN LIST THAT  
EPT IN THE REFRIGERATOR.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-14

Students should:

--name the food.

--describe changes that have occurred over the  
past several days.

--compare the results of individual student  
observations and generalize by saying, "Many  
foods spoil, rot," "Get to smelling bad."

--respond, "Microbes," "Decomposers," "Molds."

--respond, "No."

--respond, "It would make you sick," "It smells,"  
"It tastes icky."

--infer that refrigeration reduces spoilage and  
danger of illness. "So they won't spoil," "So  
they stay cold."

--infer that it is too cold for microbes to grow.

--respond with many foods.

ACTIVITY  
4-14

MATERIALS

TEACHING STRATEGIES

When in doubt about a particular food, advise students that it usually will not hurt to put the food in the refrigerator so put it in.

Collect Worksheet 4-5. After class, turn to the Development of Experience in Observation page of the Student Record of Progress. Use the worksheets to rate each student's success in making appropriate observations and recording them. Based on your ratings in Activities 4-10, 4-13, and 4-14 decide who needs help most and who can serve to assist other students. Plan to provide special help when observation is next required. Send the worksheets and a copy of your ratings to BSCS.

See Change of Pacer 15.

W  
CHANG



## TEACHING STRATEGIES

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ksheet 4-5. After class, turn to the of Experience in Observation page of the ord of Progress. Use the worksheets to rate t's success in making appropriate observations ng them. Based on your ratings in Activities and 4-14 decide who needs help most and who o assist other students. Plan to provide p when observation is next required. Send ets and a copy of your ratings to BSCS.

## ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student should, as a minimum:*

- select food samples for cool and warm experiment*
- observe both food samples for a week*
- record observations on Worksheet 4-5.*



CHANGE OF PACER

of Pacer 15.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_ Tally \_\_\_\_ Rev \_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
       --keep as is       revision suggested       major changes described       --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. Did students have difficulty recording observations on Worksheet 4-5?  
☐ No ☐ Yes Comment:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Did students have difficulty recording observations on Worksheet 4-5?  
☐ No ☐ Yes Comment:
13. Did students associate spoilage with microbial growth? ☐ No ☐ Yes How many? \_\_\_\_\_  
What did they say to indicate this?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
2. Discover environmental requirements of microbes and other decomposers.
3. Appreciate how knowledge of decomposers can improve man's environment.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Complementarity of Organisms and Environment

#### INQUIRY SKILLS:

Observing

#### PROBLEM-SOLVING SKILLS:

Asking Questions, Drawing Conclusions

#### PRACTICAL APPLICATION:

Learn Proper Storage Practices, Identify Vocational Opportunities in Food Related Industries, Practice Using Food Lists When Grocery Shopping

## ACTIVITY

### Goals for the Student:

- 1. Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

- 1. Recognize the role microbes play in the decomposition process.
- 2. Discover environmental requirements of microbes and other decomposers.
- 3. Appreciate how knowledge of decomposers can improve man's environment.

### AL THEME:

Relationships of Environmental Components,  
Interdependency of Organisms and Environment

### ILLS:

ing

### IVING SKILLS:

Questions, Drawing Conclusions

### PLICATION:

Proper Storage Practices, Identify  
Local Opportunities in Food Related  
Activities, Practice Using Food Lists When  
Shopping

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-15. STOR(ING) PROBLEMS



BSCS

ACTIVITY  
4-15

MATERIALS

- \*Cassette tape recorder (optional)
- \*Blank cassette(s) (optional)

\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-15. Stor(ing) Problems

*In this activity students will visit a supermarket to find out how the grocer deals with the problem of food spoilage. Students will learn how supermarkets preserve food. They will also become aware of some of the special problems involved in preserving very perishable products such as meats, fresh fruits, vegetables, and bakery and dairy products. The various ways the foods are displayed and stored on the shelves and in the stockroom will be observed. Interviews with various people in the store such as the general manager, the butcher, the bakery manager, and the produce manager should further establish the store's problems.*

Teacher Preparation:

1. Be sure to contact the supermarket manager well in advance (at least one week) of the date you hope to visit the store. Select with him a mutually acceptable date and time for the trip. Also decide in advance which departments you would like to visit and arrange for general remarks from the manager, butcher, bakery manager, produce manager, etc. It is also advisable to call the day before the scheduled trip to verify that all systems are still "go" for the visit.
2. If you decide to use the tape recorder in the store, ask the manager if this is okay.
3. If it is not feasible to take your class from the school to visit a store, a visit to the school cafeteria would be an acceptable substitute.

The day before the visit ask:

WHERE IS A LOT OF FOOD STORED?

HOW DO THEY STORE ALL THAT FOOD?



## TEACHING STRATEGIES

### 5. Stor(ing) Problems

ity students will visit a supermarket to find  
grocer deals with the problem of food  
students will learn how supermarkets preserve  
will also become aware of some of the special  
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the shelves and in the stockroom will be  
interviews with various people in the store  
general manager, the butcher, the bakery  
the produce manager should further establish  
problems.

#### Preparation:

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e the visit ask:

A LOT OF FOOD STORED?

HEY STORE ALL THAT FOOD?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- participate in the discussion to formulate questions prior to the store trip
- visit the supermarket
- observe various ways food storage is handled in a store
- interview various people in the supermarket
- participate in post-visit discussion.

Students should:

--respond, "Stores," "Eating places."

--give a variety of responses, "Refrigerators,"  
"Cans," "Boxes."

## MATERIALS

## TEACHING STRATEGIES

WE ARE GOING TO VISIT A SUPERMARKET TOMORROW TO SEE HOW FOOD IS STORED. WHAT ARE SOME OF THE DIFFERENT PARTS OF THE STORE WE MIGHT VISIT?

BEFORE WE GO, WE SHOULD HAVE SOME QUESTIONS IN MIND TO ASK PEOPLE WORKING THERE. WHAT ARE SOME OF THE THINGS WE COULD ASK ABOUT HOW THEY HANDLE FOOD?

ACCEPT  
ANSWE

QUESTION

ACCEPT  
ANSWE

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-15

TO VISIT A SUPERMARKET TOMORROW  
FOOD IS STORED. WHAT ARE SOME OF THE  
PARTS OF THE STORE WE MIGHT VISIT?

Students should:

--respond, "Meat section," "Bakery," "Canned foods,"  
"Vegetables and fruits."

  
**ACCEPT ALL  
ANSWERS**

, WE SHOULD HAVE SOME QUESTIONS IN  
PEOPLE WORKING THERE. WHAT ARE  
THINGS WE COULD ASK ABOUT HOW THEY

--respond with questions that could be asked about  
storing foods.

QUESTION TIME

  
**ACCEPT ALL  
ANSWERS**

As students suggest questions, write them on the chalkboard. Pursue this until questions of the following nature have been brought out:

1. What kinds of foods can you store the longest?
2. What kinds of foods spoil the fastest?
3. What are some of the things you do to keep foods from spoiling?
4. Is it against the law to sell food that has been stored a long time?
5. Do foods that spoil easily cost more because they spoil easily?
6. What do you do with spoiled food?
7. How much food has to be disposed of because it has spoiled?
8. Where and how do you store meats?
9. Where and how do you store bakery products?
10. Where and how do you store fresh fruits and vegetables?
11. Where and how do you store dairy products?
12. Does a dented can cause food to spoil?
13. What foods have dates stamped on the package? Why is this done?

Divide up the questions evenly between pairs of students and make them responsible for finding the answers. The teacher should have the list of questions with her to help restore memories, if necessary! A tape recorder may be taken on the trip to help record answers to the questions.

When you arrive at the store, tour as a group. Stop at many places and discuss the storage methods that are shown. Start with easy ones that students have had experience with in class, i.e., cold, hot, dry, and so forth. Then proceed to more subtle ones of wrapping, bottling, and canning. Do not lecture! Ask students to tell you what they see and why. It might be difficult for students to distinguish between meaningful packaging and gimmicks to sell. Help them.

## TEACHING STRATEGIES

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ue this until questions of the following  
been brought out:

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kinds of foods spoil the fastest?  
Are some of the things you do to keep foods  
spoilage?  
Against the law to sell food that has been  
a long time?  
Foods that spoil easily cost more because they  
easily?  
What do you do with spoiled food?  
Which food has to be disposed of because it has  
spoiled?  
And how do you store meats?  
And how do you store bakery products?  
And how do you store fresh fruits and  
vegetables?  
And how do you store dairy products?  
What does moldy food cause food to spoil?  
Foods have dates stamped on the package?  
What is this done?

Divide the questions evenly between pairs of students  
and make one responsible for finding the answers. The  
teacher should have the list of questions with her to  
refresh memories, if necessary! A tape recorder  
on the trip to help record answers to the

Go to the store, tour as a group. Stop at  
and discuss the storage methods that are  
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canning. Do not lecture! Ask students  
what they see and why. It might be difficult  
to distinguish between meaningful packaging  
and just to sell. Help them.

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

After the group tour, talk to various people in the store that you have arranged to meet with. Then before leaving the store, give students some free time to roam and find other examples on their own, but keep students together as a group.

The day after the visit, discuss all the questions and answers students gathered at the store. Then ask:

WHY CAN SOME FOODS BE KEPT IN THE SUPERMARKET LONGER THAN OTHERS?

WHAT IS IT THAT DECOMPOSES THE FOOD?

HOW WERE THINGS STORED AT THE SUPERMARKET?

SHOULD YOU STORE THINGS AT HOME THE WAY THEY ARE STORED IN THE SUPERMARKET?

WHY?

  
ACCEPT A  
ANSWER

## TEACHING STRATEGIES

tour, talk to various people in the store arranged to meet with. Then before leaving students some free time to roam and find on their own, but keep students together

the visit, discuss all the questions and gathered at the store. Then ask:

WHAT FOODS BE KEPT IN THE SUPERMARKET OTHERS?

WHAT DECOMPOSES THE FOOD?

WHAT IS STORED AT THE SUPERMARKET?

HOW DO THEY STORE THINGS AT HOME THE WAY THEY IN THE SUPERMARKET?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-15

Students should:

--respond, "Some rot faster."

--respond, "Microbes," "Molds."

--respond, "Frozen," "Packaged," "Dried,"  
"Precooked."

ACCEPT ALL  
ANSWERS

--respond, "Yes."

--respond, "So they won't rot, decompose," "So  
they keep longer."

*Upon completion of this activity, each student  
should, as a minimum:*

- have visited a supermarket (or school cafeteria)*
- have observed various ways food storage is  
handled in a supermarket*
- have participated in post-visit discussion.*

ACTIVITY  
4-15

**MATERIALS**

**TEACHING STRATEGIES**

✓  
CHANG

See Change of Pacers 16, 17, 18, and 19.



## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS



f Pacers 16, 17, 18, and 19.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes      Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile      ☐ Of value--needs the      ☐ Worth salvaging--make      ☐ Worthless  
                                  --keep as is      revision suggested      major changes described      --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Was a visit to the supermarket difficult to arrange?
- ☐
- No
- ☐
- Yes      Comment:

BSCS Evaluation:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

- ☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Was a visit to the supermarket difficult to arrange? ☐ No ☐ Yes Comment:
13. Were all food storage departments made available to the students? ☐ Yes ☐ No  
Comment:

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
2. Discover the environmental requirements of microbes and other decomposers.
4. Conclude that microbes contribute to man's well-being as well as pose problems for man.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Complementarity of Organisms and Environment,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Associating, Describing, Applying

#### PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

#### PRACTICAL APPLICATION:

Speaking Before a Group, Food Storage in the Home

## IVITY

ls for the Student:

Recognize the role of decomposers in the cycling process.

bjectives for the Student:

Recognize the role microbes play in the decomposition process.

Discover the environmental requirements of microbes and other decomposers.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

THEME:

Relationships of Environmental Components,  
ntarity of Organisms and Environment,  
ature of Processes

S:  
ing, Describing, Applying

NG SKILLS:  
ng, Defending, Answering Why Questions

LICATION:  
Before a Group, Food Storage in the

UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

ACTIVITY 4-16. CLUES TO SUCCESS



BSCS

ACTIVITY  
4-16

MATERIALS

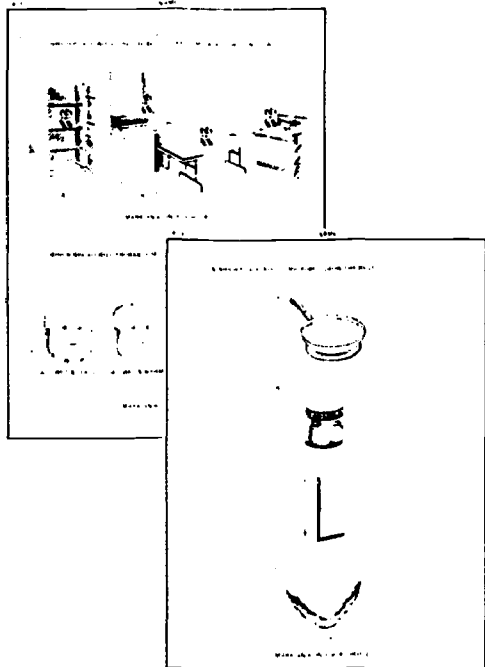
Slides 4-24 through 4-26

Worksheet 4-6

\*Groceries (at least 20 items of great variety)

\*35 mm Slide projector

Worksheet 4-6



\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-16. Clues to Success

*This clue to success consists of two parts. In Part I students will discuss real foods and their storage. Part II consists of three multiple-choice questions designed to assess the practical aspects of food storage.*

Review the last series of experiences by having the students explain how to preserve a variety of real and everyday foods. Display a wide variety of real foods. Your weekly groceries or the home economics teacher's supplies would be appropriate.

Have all students take turns in selecting a food and explaining to the class these things:

1. What is it?
2. Where does it come from (if possible)?
3. How did it get from there to you? What was done to it before reaching you?
4. How do you store it at home?
5. Do you do anything to the food before eating it? (Do you cook it?)
6. Does it spoil easily?
7. Do you eat this food often?
8. Does your body need this sort of food?
9. Is it expensive?

When each student has had a turn, continue discussing more foods as time and interest allow.

After completing this discussion, distribute Worksheet 4-6 and have students put their names on them.

Project a slide of each question separately. (Slides 4-24 through 4-26.) Read the questions and choices aloud at least twice. Allow ample time for them to mark their worksheets. Repeat this procedure for the next two questions.



## TEACHING STRATEGIES

### Clues to Success

Success consists of two parts. In Part I discuss real foods and their storage. Sets of three multiple-choice questions assess the practical aspects of food storage.

Set series of experiences by having the main how to preserve a variety of real and s. Display a wide variety of real foods. Groceries or the home economics teacher's d be appropriate.

Students take turns in selecting a food and the class these things:

What is it?  
Where does it come from (if possible)?  
How did it get from there to you? What was done before reaching you?  
How do you store it at home?  
Do you do anything to the food before eating it? (cook it?)  
Does it spoil easily?  
How often do you eat this food?  
Does your body need this sort of food?  
Is it expensive?

When a student has had a turn, continue discussing until time and interest allow.

During this discussion, distribute Worksheet and students put their names on them.

Read each question separately. (Slides 1-26.) Read the questions and choices aloud. Allow ample time for them to mark their answers. Repeat this procedure for the next two

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- participate in a discussion of food storage using real foods as a basis
- answer the questions on their worksheets.

Students should:

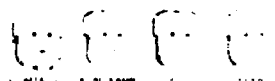
--place an X on the refrigerator in Question 1.

## MATERIALS

Slide 4-24, Question 1



Slide 4-25, Question 2



Slide 4-26, Question 3



## TEACHING STRATEGIES

After all students have had the opportunity to answer all of the questions, collect the worksheets. Again project each slide and discuss the answers with them. Have them defend their choices. After class, tally the students' answers on Tallysheet 4-4. Consider whether the whole class needs further review or if a few individuals need special attention before proceeding to the next activity.

### Interpreting and Scoring:

Items 1, 2, and 3 assess the understanding that food storage entails controlling the environment of microbes. The problem-solving skill involved is answering questions by applying knowledge gained in experiments done in this unit. To be rated successful, students must answer two of the three items correctly. Review previous activities for those who need help in grasping this concept.

Using Tallysheet 4-4, turn to the Problem-solving page of the Student Record of Progress. Find the column marked Activity 4-16, "Food Storage," and circle YES if students mark two out of the three questions correctly. Otherwise, circle NO. Then send the tallysheet to BSCS.

## TEACHING STRATEGIES

Students have had the opportunity to answer questions, collect the worksheets. Again, review and discuss the answers with them. Consider their choices. After class, tally the results on Tallysheet 4-4. Consider whether the results need further review or if a few students need special attention before proceeding with the activity.

### Scoring:

To assess the understanding that food safety involves controlling the environment of microbes, the skill involved is answering questions based on knowledge gained in experiments done in this unit. If successful, students must answer two questions correctly. Review previous activities to help in grasping this concept.

On page 4-4, turn to the Problem-solving page of the Record of Progress. Find the column marked "Food Storage," and circle YES if students answered the three questions correctly. Otherwise, send the tallysheet to BSCS.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-16

Students should:

- place an X on the "wet and warm" in Question 2.
- place an X on the sandwich in Question 3.

*Upon completion of this activity, each student should, as a minimum:*

- have discussed at least one food with emphasis on Questions 1-8*
- have completed Worksheet 4-6.*



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.
3. Appreciate how knowledge of decomposers can improve man's environment.
4. Conclude that microbes contribute to man's well-being as well as pose problems for man.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Complementarity of Organisms and Environment

#### INQUIRY SKILLS:

Applying, Predicting

#### PROBLEM-SOLVING SKILLS:

Drawing Conclusions

#### PRACTICAL APPLICATION:

Learning Food-making Skills (baking)

## ACTIVITY

als for the Student:

Recognize the role of decomposers in the cycling process.

Objectives for the Student:

Recognize the role microbes play in the decomposition process.

Appreciate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

THEME:

Relationships of Environmental Components,  
Interdependency of Organisms and Environment

AS:

g, Predicting

ING SKILLS:

Conclusions

PLICATION:

Food-making Skills (baking)

UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

ACTIVITY 4-17. A REAL GAS



BSCS

## MATERIALS

- 2 Flasks, 250 ml, widemouthed
- 2 Rubber stoppers, No. 8, one-hole
- 2 Pieces tygon tubing, 18 inches long
- 2 Pieces acrylic tubing, 3 inches long
- 2 Beakers, 400 ml
- 2 Water pipes
- Carbon dioxide test solution (bromthymol blue)
- Measuring spoons
- 2 Measuring cups
- 3 Packages dried yeast
- \*1 Can frozen concentrated grape juice; nonconcentrated juice has preservatives to prevent fermentation.
- \*2 Tablespoons sugar
- \*Water
- \*8 Cups sifted all-purpose flour
- \*2 Tablespoons salt
- \*1/4 Pound shortening
- \*1/4 Pound butter
- \*4 Large bowls
- \*4 Clean cloths
- \*2 Pans large enough to set mixing bowl in
- \*2 Sifters
- \*Not furnished in materials kit

## TEACHING STRATEGIES

### Activity 4-17. A Real Gas

*In this activity students will realize some of the beneficial aspects of microbes. Part I develops the idea that yeasts are living microbes and introduces, on a practical level, the concept of fermentation. Part II demonstrates another beneficial use of microorganisms by man - the use of yeast in baking.*

### Part I. Fermenting Grape Juice

#### WHAT HAVE WE LEARNED ABOUT MICROBES?

As the students describe things they have learned about microbes, make a list of these items on the chalkboard.

Then ask:

ARE MICROBES ALIVE?

HOW DO YOU KNOW THAT MICROBES ARE ALIVE?

WHAT ARE SOME THINGS MICROBES CAN DO?

ARE SOME MICROBES HARMFUL TO US? WHY?

ARE THERE ANY USEFUL MICROBES?

WERE OUR COMPOST MICROBES USEFUL?

WHY?

## TEACHING STRATEGIES

### 17. A Real Gas

Activity students will realize some of the benefits of microbes. Part I develops the idea that there are living microbes and introduces, on a molecular level, the concept of fermentation. Part II is another beneficial use of microorganisms by the use of yeast in baking.

### Fermenting Grape Juice

HAVE WE LEARNED ABOUT MICROBES?

Students describe things they have learned about microbes. Make a list of these items on the chalkboard.

ARE MICROBES ALIVE?

DO YOU KNOW THAT MICROBES ARE ALIVE?

ARE THERE SOME THINGS MICROBES CAN DO?

ARE SOME MICROBES HARMFUL TO US? WHY?

ARE THERE ANY USEFUL MICROBES?

DOES OUR COMPOST MICROBES USEFUL?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- observe the demonstration of wine fermentation
- infer that yeasts are living organisms
- recognize the role of yeast in making wine
- participate in making bread
- recognize the role of yeast in making bread
- infer that some microbes are beneficial to man.

Students should:

- recall and describe various facts about microbes, such as, "They grow better in wet and warm places," "They breathe," "They're alive," and so forth.

- respond, "Yes."

- cite evidence such as growth, eating things, and making things smell bad and respond, "They breathe," "They rot things."

- recall, "Cause bread to get moldy," "Cause disease."

- recall Unit II and respond, "Yes," "They make us sick."

- recall composting setup and respond, "Yes."

- respond, "Yes."

- respond, "They broke down the garbage," "They made the soil better."

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST

MODERATE INTEREST OR INDIFFERENCE

RESISTANCE OR DISLIKE


6. Equipment problems? In kit?
- ☐
- No
- ☐
- Yes Obtained by you?
- ☐
- No
- ☐
- Yes
- 
- If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow?
- ☐
- Yes
- ☐
- No -- Pages and Problem:

10. Did you omit any part(s) of this activity?
- ☐
- Yes
- ☐
- No -- Identify which part(s) were omitted and
- WHY
- :

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
                     --keep as is                      revision suggested                      major changes described                      --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. Were any questions on Worksheet 4-6 not useful?
- ☐
- No
- ☐
- Yes: Which ones? \_\_\_\_\_
- 
- Explain:

Did students attempt to defend their worksheet answers? ☐ No ☐ Yes  
What were their arguments?



7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No    ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

- ☐ Worthwhile    ☐ Of value--needs the    ☐ Worth salvaging--make    ☐ Worthless  
                     --keep as is    revision suggested    major changes described    --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Were any questions on Worksheet 4-6 not useful? ☐ No ☐ Yes: Which ones? \_\_\_\_\_  
 Explain:
13. Did students attempt to defend their worksheet answers? ☐ No ☐ Yes  
 What were their arguments?
14. Do you have other questions to suggest for this assessment?
15. Please send in Tallysheet 4-4 and Student Worksheet 4-6.

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

Concern (or questions) about content:

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

## MATERIALS

## TEACHING STRATEGIES

TODAY WE ARE GOING TO SEE SOME OTHER GOOD THINGS MICROBES DO WHEN THEY BREAK THINGS DOWN.

Hold up a package of yeast and ask:

WHAT IS THIS?

WHAT IS YEAST?

YEAST IS A MICROBE.

ARE YEAST MICROBES ALIVE?

HOW COULD WE FIND OUT IF YEAST MICROBES ARE ALIVE?

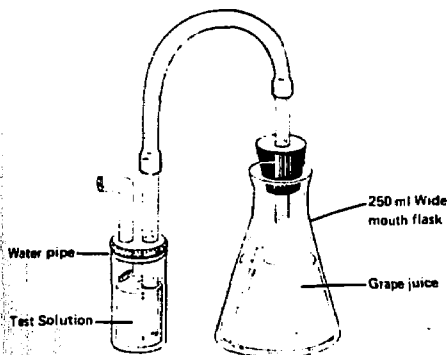
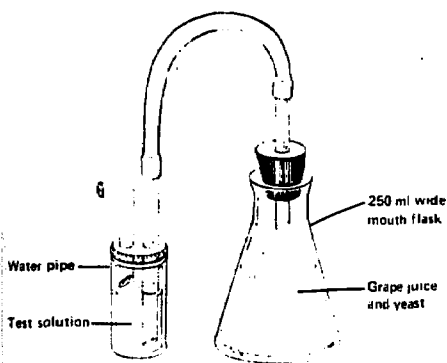
IF YEAST MICROBES ARE ALIVE, WHAT WOULD THEY NEED TO GROW AND STAY ALIVE?

WE ARE GOING TO SEE IF WE CAN FEED OUR YEAST SOME GRAPE JUICE. WHAT DO YOU SUPPOSE WILL HAPPEN IF WE PUT YEAST IN GRAPE JUICE?

Set up the demonstration as follows. (See Diagram 4-8.) Allow students to assist you wherever possible.

1. Prepare grape juice according to the directions on the container.
2. Fill two 250 ml widemouthed flasks about one-half full of grape juice.
3. Add one tablespoon sugar to each flask.

Diagram 4-8



## TEACHING STRATEGIES

ARE GOING TO SEE SOME OTHER GOOD  
MICROBES DO WHEN THEY BREAK THINGS

age of yeast and ask:

IS?

FAST?

MICROBE.

MICROBES ALIVE?

WE FIND OUT IF YEAST MICROBES ARE

MICROBES ARE ALIVE, WHAT WOULD THEY  
DO AND STAY ALIVE?

NG TO SEE IF WE CAN FEED OUR YEAST  
JUICE. WHAT DO YOU SUPPOSE WILL  
WE PUT YEAST IN GRAPE JUICE?

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to assist you wherever possible.

rape juice according to the directions  
ntainer.

250 ml widemouthed flasks about one-  
of grape juice.

tablespoon sugar to each flask.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-17

Students should:

--respond, "Yeast."

--respond, "I don't know," "Powder," "Something  
you use to make bread."

--probably respond, "No," "Could be."

--suggest various responses such as, looking at  
them, feeding them, seeing if they will grow,  
seeing if they breathe.

--suggest they would need food.

--respond, "I don't know," "Make bubbles," "The  
yeast will eat the grape juice," "The grape  
juice will disappear."

**MATERIALS**

**TEACHING STRATEGIES**

4. To one flask only add one-half teaspoon of dried yeast.
5. Label the one flask "grape juice" and the other "grape juice and yeast."
6. Add water to each water pipe up to the mark. Add five or six drops of carbon dioxide test solution (bromthymol blue) to each water pipe. Swirl gently to mix.

When both setups are completely assembled, ask:

WHY DID I CONNECT THE BOTTLE CONTAINING THE YEAST TO THE BLUE VIAL?

HOW WILL I KNOW IF YEAST CAN GIVE OFF CARBON DIOXIDE?

Next, point to the setup containing the grape juice, and say:

WHAT DO YOU THINK WILL HAPPEN TO THE TEST SOLUTION CONNECTED TO THE GRAPE JUICE WITH NO YEAST?

WHY DO YOU THINK THERE SHOULD BE NO COLOR CHANGE?

WE WILL LEAVE THESE SET UP OVERNIGHT AND WILL EXAMINE THEM TOMORROW.

## TEACHING STRATEGIES

the flask only add one-half teaspoon of dried yeast.

1. the one flask "grape juice" and the other flask grape juice and yeast."

water to each water pipe up to the mark. Five or six drops of carbon dioxide test solution (bromthymol blue) to each water pipe. Gently to mix.

When setups are completely assembled, ask:

Q. DID I CONNECT THE BOTTLE CONTAINING THE YEAST TO THE BLUE VIAL?

Q. WILL I KNOW IF YEAST CAN GIVE OFF CARBON DIOXIDE?

Q. What do you think will happen to the test solution connected to the grape juice with yeast?

Q. DO YOU THINK THERE SHOULD BE NO COLOR CHANGE?

Q. WILL I LEAVE THESE SET UP OVERNIGHT AND WILL I CHECK THEM TOMORROW.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--recall Activity 4-12 and say, "To see if they give off carbon dioxide."

--recall previous work and predict, "The test solution will turn yellow."

--predict that there would be no color change.

--respond, "No yeast in it," "It's a control," "No breathing."



## MATERIALS

## TEACHING STRATEGIES



Ask:

WHAT CHANGE HAS OCCURRED IN THE SETUP WITH THE YEAST?

WHAT TELLS US THAT YEAST MICROBES ARE ALIVE?

WHAT HAPPENED TO THE SETUP WITH NO YEAST?

WHAT DOES THIS TELL US?

Remove the stopper from the flask containing the plain grape juice and ask several students to smell it. Then have them smell the fermented grape juice from the other flask.

Ask:

DO THEY SMELL THE SAME?

HOW DOES THE GRAPE JUICE SMELL?

HOW DOES THE GRAPE JUICE WITH YEAST SMELL?

HOW CAN YOU EXPLAIN THE DIFFERENCE IN THE SMELL?

HOW COULD THE YEAST CAUSE THE GRAPE JUICE TO CHANGE INTO WINE?



## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-17



Students should:

GE HAS OCCURRED IN THE SETUP WITH THE

S US THAT YEAST MICROBES ARE ALIVE?

NED TO THE SETUP WITH NO YEAST?

THIS TELL US?

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ask several students to smell it. Then  
the fermented grape juice from the other

ELL THE SAME?

HE GRAPE JUICE SMELL?

HE GRAPE JUICE WITH YEAST SMELL?

U EXPLAIN THE DIFFERENCE IN THE SMELL?

THE YEAST CAUSE THE GRAPE JUICE TO  
O WINE?

--respond, "Solution has changed to yellow."

--respond, "Yeast gives off carbon dioxide," "Yeast makes bubbles."

--respond, "Nothing," "The solution is still blue."

--reply, "Nothing was breathing," "No microbes are in it," "No carbon dioxide made."

--respond, "No."

--respond, "Good," "Like grape juice."

--reply, "Bad," "Like wine," "Stinky," "Like booze."

--infer that the difference must be the result of the yeast and respond, "Yeast makes it turn into wine," "Yeast makes it stink."

--infer that the change must have been caused by something that the yeast gave off or did, "Yeast ate the grape juice and made wine," "The carbon dioxide did it."

## MATERIALS

### BREAD RECIPE:

- 1 Measuring cup
- \*1 Package quick acting yeast
- \*2 Cups lukewarm water
- \*4 Cups sifted all-purpose flour
- \*1 Tablespoon salt
- \*2 Large bowls
- \*2 Clean cloths
- \*1 Sifter
- \*2 Bread pans
- \*1 Pan large enough to set mixing bowl in
- \*Shortening to grease pans
- \*Butter
- \*Not furnished in materials kit

## TEACHING STRATEGIES

Discuss all student responses. Finally say:

YEAST MICROBES ARE LIVING. WHEN YEAST MICROBES EAT SOMETHING LIKE GRAPE JUICE, THEY GIVE OFF A GAS AND ALCOHOL. MAN USES YEAST MICROBES TO MAKE WINE AND BEER. THE SMELL IN THE FLASK WITH THE YEAST WAS DUE TO ALCOHOL.

Caution students against drinking any of the wine. Explain that wine produced under such conditions may not be safe to drink.

DO YOU THINK THAT ALL MICROBES ARE HARMFUL TO MAN?

Discuss student responses. If students suggest the harmful effects of alcohol and maintain that microbes are bad, ask if they can think of any way that microbes such as yeast may help us. Defer further discussion until the next portion of the activity is completed.

### Part II. Making Bread

The recipe that is given is extremely simple - anyone can do it! It is fail safe - you can't miss. If you are particularly nervous about it, you might enlist the aid of the school home economics teacher. Two batches of bread will be made, one with yeast and one without yeast. Students will observe the effects of yeast in making bread, both in the rising and in the baking of

## TEACHING STRATEGIES

student responses. Finally say:

MICROBES ARE LIVING. WHEN YEAST MICROBES  
SOMETHING LIKE GRAPE JUICE, THEY GIVE OFF  
AND ALCOHOL. MAN USES YEAST MICROBES TO  
WINE AND BEER. THE SMELL IN THE FLASK WITH  
YEAST WAS DUE TO ALCOHOL.

Warn students against drinking any of the wine.  
That wine produced under such conditions may not  
be drink.

THINK THAT ALL MICROBES ARE HARMFUL

?

Anticipate student responses. If students suggest the  
effects of alcohol and maintain that microbes  
don't know if they can think of any way that microbes  
might help us. Defer further discussion  
until the next portion of the activity is completed.

### Baking Bread

What is given is extremely simple - anyone can  
do it safely - you can't miss. If you are  
nervous about it, you might enlist the aid  
of a home economics teacher. Two batches of  
bread will be made, one with yeast and one without  
yeast. Students will observe the effects of yeast in  
the dough, both in the rising and in the baking of

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "No." Some students may suggest that  
yeasts are bad since drinking alcohol may be  
harmful.

## MATERIALS

NOTE: You will need enough ingredients for four loaves of bread; two with yeast and two without yeast. The above ingredients make two loaves.

## TEACHING STRATEGIES

the product. If you have a stove at school to bake the two batches of bread, use that. The results will be dramatic. If not, terminate the experiment after the students observe the difference in rising of the four loaves; then take the dough home and bake it. Bring the four loaves the next day.

Begin the experiment by asking:

WHAT MATERIALS WOULD WE NEED IN ORDER TO MAKE A LOAF OF BREAD?

Then say:

WHAT IS YEAST?

✓ WHY DO YOU SUPPOSE YEAST IS USED IN MAKING BREAD?

DO YOU THINK IT WOULD MAKE ANY DIFFERENCE IF BREAD WAS MADE WITHOUT YEAST?

HOW COULD WE FIND OUT?

IF WE MADE SOME BREAD WITH YEAST AND SOME WITHOUT YEAST, WHAT WOULD YOU PREDICT WOULD HAPPEN?

LET'S MAKE FOUR LOAVES OF BREAD, TWO WITH YEAST AND TWO WITHOUT, AND SEE WHAT HAPPENS.

Divide the students into two groups. One group will make the unleavened bread, the other group will make the yeast bread. Copy the recipes below on the chalkboard or ditto them for students to follow.

## TEACHING STRATEGIES

you have a stove at school to bake the bread, use that. The results will be different. If you terminate the experiment after the first rise, the difference in rising of the four loaves will be more pronounced. Bake the dough home and bake it. Bring the loaves home the next day.

ment by asking:

WHAT MATERIALS WOULD WE NEED IN ORDER TO MAKE BREAD?

WHAT NEXT?

SUPPOSE YEAST IS USED IN MAKING BREAD. WHAT DIFFERENCE WOULD IT MAKE?

WHAT DIFFERENCE WOULD IT MAKE IF WE MADE BREAD WITHOUT YEAST?

HOW CAN WE FIND OUT?

IF WE MADE SOME BREAD WITH YEAST AND SOME WITHOUT YEAST, WHAT WOULD YOU PREDICT WOULD HAPPEN?

IF WE MADE FOUR LOAVES OF BREAD, TWO WITH YEAST AND TWO WITHOUT, AND SEE WHAT HAPPENS.

Divide the class into two groups. One group will make bread, the other group will make the yeast bread. Write the recipes below on the chalkboard or ditto them out for students to follow.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-17

Students should:

--recall and respond, "Flour," "Salt," "Sugar," and "Yeast."

--recall the grape juice activity and respond, "Microbes," "Good microbes."

--respond, "Don't know," "Makes it rise," "To make it taste better."

--suggest making bread with and without yeast.

--suggest making bread with and without yeast.

--probably predict with considerable variety what would happen to the loaves of bread.

Bread Recipe (Leavened)

Dissolve by stirring, one package of yeast in one cup of lukewarm water. While the yeast softens, sift the flour, sugar, and salt together in the large bowl, then stir in the dissolved yeast. Add enough of the second cup of water to hold the dough together. With greased hands, mix until you have a soft, rather sticky dough. Place the bowl in a pan of warm water, cover the dough with a moist, clean cloth, and let rise until it doubles in size (two to four hours).

Punch the raised dough down with your fist and give it a good beating. Don't knock all the air bubbles out. Place the dough in two greased 9 X 5 X 3 inch loaf baking pans. Cover and let the dough rise until it reaches the top of the pan or doubles in size. Then bake at 400 degrees for one hour. If crust begins to burn or gets too brown, cover with aluminum foil. Brush the top with melted butter.

Bread Recipe (Unleavened)

Sift flour, sugar and salt together in large bowl. Add enough water to hold dough together. With greased hands mix until you have a soft, rather sticky dough. Place the bowl in a pan of warm water, cover the dough with a moist clean cloth. Let stand for two to four hours.

Place the dough in two greased 9 X 5 X 3 inch loaf baking pans. Cover and let stand about 30 minutes. Bake at 400 degrees for one hour. If crust begins to burn, cover with aluminum foil.



## TEACHING STRATEGIES

### pe (Leavened)

y stirring, one package of yeast in one cup of water. While the yeast softens, sift the flour, salt together in the large bowl, then stir in ved yeast. Add enough of the second cup of old the dough together. With greased hands, you have a soft, rather sticky dough. Place n a pan of warm water, cover the dough with lean cloth, and let rise until it doubles (two to four hours).

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### pe (Unleavened)

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dough in two greased 9 X 5 X 3 inch loaf baking r and let stand about 30 minutes. Bake at for one hour. If crust begins to burn, cover um foil.

## ANTICIPATED STUDENT BEHAVIORS



## MATERIALS

## TEACHING STRATEGIES

The difference between the two sets of loaves should be dramatic. The difference will be apparent both before and after baking.

When the baking of the loaves has been completed, ask:

WHAT DIFFERENCE DO YOU SEE IN THE TWO SETS OF LOAVES OF BREAD?

WHAT DO YOU THINK MADE THIS DIFFERENCE?

THINK ABOUT WHAT HAPPENED WHEN WE PUT YEAST IN THE GRAPE JUICE. CAN YOU EXPLAIN WHY TWO LOAVES OF BREAD GOT LARGER?

Review the grape juice experiment if necessary to elicit the desired response.

DO YOU THINK THE TWO SETS OF LOAVES WILL TASTE ANY DIFFERENT?

Allow students to taste each of the loaves.

Then ask:

WHICH KIND OF BREAD WOULD YOU RATHER HAVE IN A SANDWICH?

WHY?

HOW COULD YEAST MAKE THE BREAD TASTE DIFFERENT?



## TEACHING STRATEGIES

Between the two sets of loaves should be difference will be apparent both before

of the loaves has been completed, ask:

WHENCE DO YOU SEE IN THE TWO SETS OF BREAD?

WHAT MADE THIS DIFFERENCE?

WHAT HAPPENED WHEN WE PUT YEAST IN BREAD? CAN YOU EXPLAIN WHY TWO SETS OF BREAD GOT LARGER?

Repeat the juice experiment if necessary to elicit response.

ASK THE TWO SETS OF LOAVES WILL TASTE DIFFERENT?

Let students taste each of the loaves.

WHICH OF BREAD WOULD YOU RATHER HAVE IN A SANDWICH?

WHAT CAN YEAST MAKE THE BREAD TASTE DIFFERENT?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-17

Students should:

--respond that the loaves without the yeast are smaller and flatter.

--recognize that the yeast must have made the difference since it was the only thing that was different in the two sets of loaves.

--suggest that the yeast must have caused the bread to rise and respond, "The yeast made the bread rise."

--respond, "Yes," "No," "Maybe."

--respond; "The one with the yeast."

--respond, "It tastes better," "Not so hard."

--suggest that something must be given off by the yeast that makes the bread taste better and respond, "The microbes make it taste good," "There's more air in it," "The yeast is the difference."

**MATERIALS**

**TEACHING STRATEGIES**

ARE ALL MICROBES BAD FOR US?

WE HAVE SEEN THAT YEAST MICROBES MAY BE HELPFUL. THERE ARE LOTS OF OTHER HELPFUL MICROBES. SOME ARE USED TO MAKE CHEESE, OTHERS HELP MAKE SAUERKRAUT, AND OTHERS ARE USED TO MAKE MEDICINES THAT HELP US GET WELL WHEN WE ARE SICK. SCIENTISTS TELL US THAT THERE ARE MANY MORE MICROBES THAT HELP US THAN THERE ARE MICROBES THAT ARE HARMFUL TO US.

See Change of Pacer 20.

✓  
CHANG

## TEACHING STRATEGIES

ARE MICROBES BAD FOR US?

WE HAVE SEEN THAT YEAST MICROBES MAY BE HELPFUL.  
THERE ARE LOTS OF OTHER HELPFUL MICROBES. SOME  
ARE USED TO MAKE CHEESE, OTHERS HELP MAKE  
SAUSAGE, AND OTHERS ARE USED TO MAKE MEDICINE  
THAT HELP US GET WELL WHEN WE ARE SICK.  
SCIENTISTS TELL US THAT THERE ARE MANY MORE  
KINDS OF MICROBES THAT HELP US THAN THERE ARE MICROBES  
THAT ARE HARMFUL TO US.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "No," "There were good microbes  
in the bread."

*Upon completion of this activity, each student  
should, as a minimum:*

- have observed changes in the test solution  
as a result of yeast action on grape juice*
- have helped make bread*
- have stated that some microbes, such as yeast,  
are helpful to man.*



CHANGE OF PACER

f Pacer 20.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST  
MODERATE INTEREST OR INDIFFERENCE  
RESISTANCE OR DISLIKE


6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Did students understand what the yeast did? ☐ No ☐ Yes  
If yes, what did they say to indicate this?

7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

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☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

#### Specific Questions:

12. Did students understand what the yeast did? ☐ No ☐ Yes  
If yes, what did they say to indicate this?

13. Did any students have difficulty accepting some microbes as good? ☐ No ☐ Yes  
Comment:

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
5. Comprehend the role of man as an integral part of nature, not apart from nature.

##### Core B Objectives for the Student:

1. Recognize the role microbes play in the decomposition process.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components, Diversity and Pattern, Complementarity of Organisms and Environment, Cyclic Nature of Processes

#### INQUIRY SKILLS:

Associating, Translating

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task, Organizing Data

#### PRACTICAL APPLICATION:

Application of Knowledge to Do a Given Task



## ACTIVITY

### Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of materials and organisms in the environment.
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### B Objectives for the Student:

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### TAL THEME:

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### ILLS:

iating, Translating

### LVING SKILLS:

ng Question and Task, Organizing Data

### APPLICATION:

cation of Knowledge to Do a Given Task

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

ACTIVITY 4-18. ROUNDOING OUT  
THE FOOD CHAIN



BSCS

ACTIVITY  
4-18

MATERIALS

- 1 Deck of flash cards
- 1 "Decomposer" flash card
- 4 "Decomposer" playing cards
- Food Chain Game cards sorted into 4 sets of the following:

Hawk	Leaves
Frog	Fruits
Mosquito	Chicken
Man	Mountain lion
Cow	Deer
Grass	Worm
Snake	Fish
Frog	Pig
Insect	Rabbit
Grain	

Slide 4-27

- \*2 Large pieces butcher paper per team
- \*Felt pens
- \*Masking tape
- \*35 mm Slide projector

\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-18. Rounding Out the Food Chain

*This activity climaxes Core B because it introduces the concept of a cycle and answers some of the questions posed earlier in the core. It may still be difficult for students to appreciate the very complex idea of the cyclic nature of the living world.*

Begin by placing on the chalk tray the flash cards listed below in the order shown. Draw arrows between the cards.

HAWK → SNAKE → FROG → INSECTS → GRASS

Then ask:

WHAT HAVE I SHOWN AT THE BOARD?

I ASKED A QUESTION A LONG TIME AGO THAT WE COULDN'T ANSWER VERY WELL. CAN YOU ANSWER IT NOW? WHAT EATS A HAWK?

Students will probably have difficulty with this question even at this point. Continue by asking such things as:

DO HAWKS LIVE FOREVER?

WHAT HAPPENS TO DEAD HAWKS?

WHY AREN'T ANIMALS PILING UP OUTSIDE?

When students have identified and recalled the role of decomposers from their experience, add to the chain on the chalkboard by placing the large "decomposer" card to the left of the hawk card.

DECOMPOSER → HAWK → SNAKE → ETC.

## TEACHING STRATEGIES

### 18. Rounding Out the Food Chain

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→ SNAKE → FROG → INSECTS → GRASS

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OSER → HAWK → SNAKE → ETC.

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- define the word cycle
- recognize the role of decomposers in natural cycles
- make a representation of a natural cycle.

Students should:

--recall previous work and say, "Food chain."

--respond, "Don't know," "Maybe an eagle," "Decomposers."

--recall previous experiences and answer appropriately.

--respond, "Get stinky," "Smelly," "Get rotten," "They rot," "Decompose."

--respond, "They get eaten up," "They rot away," "They decompose."

## MATERIALS

## TEACHING STRATEGIES

Then ask:

DO YOU THINK DECOMPOSERS LIVE FOREVER?

WHAT DO YOU THINK HAPPENS TO DECOMPOSERS AFTER THEY DIE?

WHERE WILL THE STUFF GO AFTER DECOMPOSERS HAVE EATEN IT AND BROKEN IT UP?

If students have difficulty with this question, review the discussion held earlier on the class compost pile. Probe and review until students tell you that decomposed things are put back into the soil.

Then ask:

WHAT LIVING THINGS NEED THE PIECES OF DECOMPOSED STUFF FROM THE SOIL?

If students have difficulty with this question, ask:

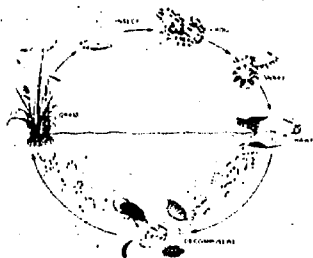
WHAT LIVING THINGS NEED SOIL TO GROW?

Now project Slide 4-27. This slide summarizes the food chain just discussed and at the same time, introduces decomposers as an important link in food chains. In fact, it transforms a chain into a cycle. Carefully explain and discuss what the slide illustrates. Say:

WE'VE LEARNED THAT A PLANT IS PART OF EVERY FOOD CHAIN. IN THIS SLIDE, WHAT IS EATING THE GRASS?

Continue the questioning in a similar manner until you reach the hawk. Then say:

Slide 4-27



## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-18

Students should:

--respond, "Yes," "No," "Don't know."

--speculate, "Eaten by other decomposers,"  
"Eaten by microbes," "Go into soil," "Nothing."

--respond, "Into the soil."

--respond, "Plants."

--respond, "Plants."

--respond, "Insect," "Moth."

KNK DECOMPOSERS LIVE FOREVER?

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Then say:

## MATERIALS

## TEACHING STRATEGIES

WHAT HAS HAPPENED TO THE HAWK?

If the students don't make this inference or question the reasons for the hawk's death, remind them that while other animals don't normally eat hawks, they don't live forever.

Ask:

WHAT DID WE SAY HAPPENS TO HAWKS OR OTHER ANIMALS WHEN THEY DIE?

WHAT IS IN THE GROUND THAT CAUSES THE HAWK TO DECOMPOSE?

DO YOU THINK THE MICROBES THAT HELP DECOMPOSE THE HAWK ARE GOOD OR BAD?

If the students don't recognize the beneficial effects of these microbes, ask:

WHAT WOULD YOUR ENVIRONMENT BE LIKE IF MICROBES DIDN'T HELP DECOMPOSE DEAD PLANTS AND ANIMALS?

ARE MICROBES HELPING OR HURTING US BY DECOMPOSING DEAD THINGS?

HOW DO THEY HELP US?

Then ask:

## TEACHING STRATEGIES

HAS HAPPENED TO THE HAWK?

If the students don't make this inference or question the reasons for the hawk's death, remind them that while other animals don't normally eat hawks, they don't live forever.

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OW DO THEY HELP US?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--infer that the hawk is dead, "Fallen to ground," "Probably was shot down," "It's dead."

--respond, "They rot," "They go into the ground,"  
"They decompose."

--respond, "Bugs," "Microbes," "Water," "I don't know."

--respond, "Good," "Bad," "I don't know."

--respond, "Be a lot of dead things around,"  
"Everything would smell."

--respond, "Helping us."

--respond, "Keep dead things from piling up."

## MATERIALS

## TEACHING STRATEGIES

WHAT HAPPENS TO THE HAWK AS IT DECOMPOSES?

If students fail to recognize that the hawk's remains gradually disappear into the ground, ask:

AS THE HAWK BREAKS UP INTO LITTLE PIECES, WHERE DO THESE PIECES GO?

Continue by asking:

IF SOME OF THE PIECES GO INTO THE GROUND, WHAT DOES THIS DO TO THE SOIL?

If students do not see that adding decaying material is beneficial, help them to recall the compost activities. Say:

WHAT WAS ADDED TO SOIL TO MAKE OUR COMPOST?

WHAT HAPPENS TO THIS STUFF AFTER MANY DAYS?

WHAT DOES THIS DO TO THE SOIL?

Summarize this line of inquiry by saying:

WE CAN MAKE COMPOST BY CUTTING THINGS UP AND ADDING THEM TO MOIST SOIL FOR DECOMPOSERS TO BREAK UP. THE SAME THING HAPPENS OUT IN THE FIELDS AND IN THE WOODS WHEN PLANTS AND ANIMALS DIE. IT MAY TAKE A LITTLE LONGER, BUT IN THE END THE DEAD MATERIAL IS DECOMPOSED AND BECOMES A PART OF THE SOIL.



## TEACHING STRATEGIES

5 TO THE HAWK AS IT DECOMPOSES?

Students fail to recognize that the remains gradually disappear into the ground, ask:

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eg:

THE PIECES GO INTO THE GROUND,  
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Students do not see that adding decaying material is beneficial, help them to understand the compost activities. Say:

WHAT IS ADDED TO SOIL TO MAKE OUR  
GARDEN?

WHAT HAPPENS TO THIS STUFF AFTER MANY  
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Line of inquiry by saying:

COMPOST BY CUTTING THINGS UP AND  
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WOODS WHEN PLANTS AND ANIMALS  
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END, THE MATERIAL IS DECOMPOSED AND  
BECOMES PART OF THE SOIL.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-18

Students should:

--respond, "It stinks," "It breaks up,"  
"Goes into the dirt."

--reply, "Goes into the ground," "Blown away."

--respond, "Makes it better," "I don't know,"  
"Nothing," "Fertilizes the soil."

--respond, "Garbage," "Food," "Glass."

--respond, "It changes color," "It gets smaller,"  
"It breaks up."

--respond, "Fertilizes it," "Makes it richer."

**MATERIALS**

**TEACHING STRATEGIES**

Direct attention to the slide again, and ask:

DOES GRASS REALLY EAT DECOMPOSERS?

Point to arrow between plants and decomposers.

THIS ARROW MEANS THAT PLANTS NEED DECOMPOSERS. ALTHOUGH THEY DON'T EAT DECOMPOSERS, THEY NEED WHAT THE DECOMPOSERS PUT INTO THE SOIL TO MAKE THEIR FOOD.

You must help students a great deal at this point and explain to them that materials are cycled through nature and that a "piece" of an animal may very well end up in a plant. Point to the roots of the grass on the slide and say:

ALONG WITH WATER, THE ROOTS OF PLANTS TAKE IN TINY PIECES OF THE HAWK, AND PIECES FROM OTHER DECOMPOSING PLANTS AND ANIMALS. THESE MATERIALS MOVE UP INTO THE LEAVES WHERE THEY ARE USED BY THE PLANT IN MAKING FOOD.

It may be necessary to emphasize that the "pieces" we are talking about are not visible. They are too small to be seen with the eye. They are even too small to be seen with the students' microscopes.

Introduce the word "cycle" to your students now by making a circular, sweeping motion with your arm in the direction of the arrows on the slide. Say:

WHAT KIND OF FIGURE DO THE ARROWS FORM?

Write the word "cycle" on the chalkboard. Then say:

## TEACHING STRATEGIES

ntion to the slide again, and ask:

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## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "No," "Yes," "Don't know."

--respond, "A circle."

## MATERIALS

## TEACHING STRATEGIES

WE WILL USE THE WORD "CYCLE" FOR THINGS THAT GO AROUND IN CIRCLES.

WHAT IS A WORD YOU USE THAT HAS THE WORD "CYCLE" IN IT?

WHAT IS GOING AROUND IN CIRCLES IN A MOTORCYCLE?

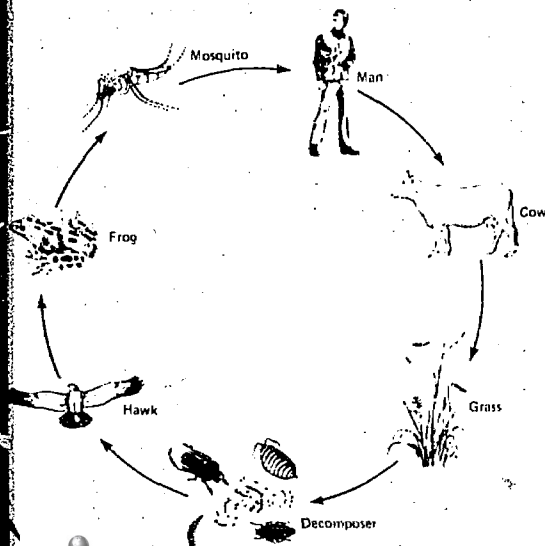
Explain that bicycle, tricycle, etc., do stem from the word "cycle" and circles.

The idea of cycles may not be an easy one for your students. Be patient and give them assistance.

Divide the class in teams of four and distribute to each group the hawk, frog, mosquito, man, cow, and grass cards from the decks of Food Chain Game cards. Also distribute a "decomposer" card. Give each group a square piece of butcher paper.

Direct each group to make an example of a cycle by arranging the cards in a circle on a piece of butcher paper. Put a piece of masking tape on the back of the cards to hold them in place. Have them connect their pictures with arrows drawn with the felt pens. Assist them in the task but do not tell them what to do.

Diagram 4-9



Only one cycle will be probable for the groups. Check to see that they know the concept of cycle and have arranged cards in the order indicated in Diagram 4-9.



## TEACHING STRATEGIES

THE WORD "CYCLE" FOR THINGS THAT  
N CIRCLES.

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## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-18

Students should:

--respond, "Motorcycle."

--respond, "The wheels."



WORK  
TIME

## MATERIALS

## TEACHING STRATEGIES

Have each group display their cycles by attaching their pieces of butcher paper to the chalkboard. Ask for volunteers to explain their cycles to the class.

Make sure at this time that students understand the concept of the cycle.

Continue the activity by saying:

YOU HAD ONLY SEVEN CARDS TO USE IN YOUR POSTER. NOW I'M GOING TO GIVE EACH GROUP MORE CARDS. YOU ARE TO MAKE ANOTHER FOOD CYCLE WITH SOME OF THESE CARDS. YOU CAN USE THE CARDS FROM YOUR FIRST CYCLE IF YOU WISH. USE FELT PENS AS YOU DID BEFORE TO SHOW THE CYCLE.

Distribute butcher paper again to each group and the additional cards from the Food Chain Game.

Leaves	Snake
Mouse	Worm
Chicken	Insects
Mountain lion	Pig
Grain	Rabbit
Deer	

Have each group display and explain the food cycle they have constructed. In the discussion be sure students understand how decomposers turn the food chain into a cycle.

At this point, have students review *The Long Journey* to answer the question on the last page. Have them discuss what would follow the possibilities of cutting their hair and throwing it away, and their dying.

## TEACHING STRATEGIES

Group display their cycles by attaching their butcher paper to the chalkboard. Ask for to explain their cycles to the class.

At this time that students understand the the cycle.

Be activity by saying:

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Worm  
Insects  
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Rabbit

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WORK  
TIME

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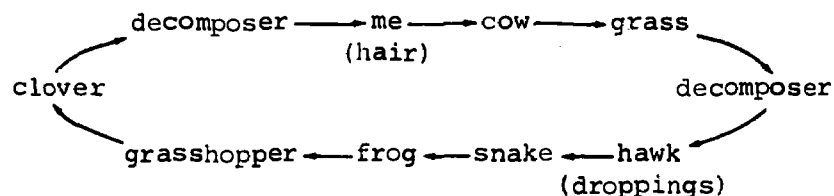
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## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

Then have students make a food cycle of the story, starting with them and working back to the clover. Join the ends with a decomposer, and add a decomposer between the hawk's droppings and the grass. (It will probably be too difficult for students to include the air in their cycle.)



Summarize the activity by asking:

WHAT IS A CYCLE?

WHAT LIVING THINGS HELP MAKE CYCLES OUT OF  
FOOD CHAINS?

WHAT DO DECOMPOSERS DO THAT MAKES THEM SO  
IMPORTANT IN CYCLES?

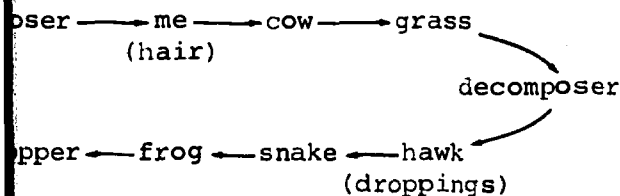
See Change of Pacers 21 and 22.

CHANGE OF



## TEACHING STRATEGIES

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CYCLE?

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S?

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## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-18

Students should:

--respond, "Something that goes in circles."

--respond, "Decomposers."

--recall previous work and respond, "Break things  
down," "Make things rot," "Put stuff back in  
the soil."

Upon completion of this activity, each student  
should, as a minimum:

- be able to construct a simple food cycle by  
including a decomposer
- be able to explain how a decomposer can make  
a food chain into a food cycle.



CHANGE OF PACER

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_\_ Tally \_\_\_\_\_ Rev \_\_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Could students realize what happened to decomposed things? ☐ No ☐ Yes  
Comment:

ERIC Did any students have difficulty understanding Slide 4-27? ☐ No ☐ Yes  
Explain:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
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#### Specific Questions:

12. Could students realize what happened to decomposed things? ☐ No ☐ Yes  
Comment:
13. Did any students have difficulty understanding Slide 4-27? ☐ No ☐ Yes  
Explain:
14. Did any students recall that decayed material is beneficial to the soil?  
☐ No ☐ Yes Who? \_\_\_\_\_ How did they express this understanding?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

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C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.

##### Core B Objectives for the Student:

3. Appreciate how knowledge of decomposers can improve man's environment.
4. Conclude that microbes contribute to man's well-being as well as pose problems for man.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Identifying, Applying

#### PROBLEM-SOLVING SKILLS:

Discussion and Treatment of Group Data,  
Explaining

#### PRACTICAL APPLICATION:

Following Instructions, Recalling

## ACTIVITY

### Goals for the Student:

Develop an understanding of cycling and appreciate the cycling relationship of materials and organisms in the environment.

Recognize the role of decomposers in the cycling process.

### Objectives for the Student:

Appreciate how knowledge of decomposers can improve man's environment.

Conclude that microbes contribute to man's well-being as well as pose problems for man.

### LEARNING THEME:

Relationships of Environmental Components,  
Nature of Processes

### LEARNING STYLES:

Learning, Applying

### LEARNING SKILLS:

Analysis and Treatment of Group Data,  
Learning

### APPLICATION:

Following Instructions, Recalling

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE B.

DECOMPOSERS IN  
MY ENVIRONMENT

## ACTIVITY 4-19. CLUES TO SUCCESS



**BSCS**

ACTIVITY  
4-19

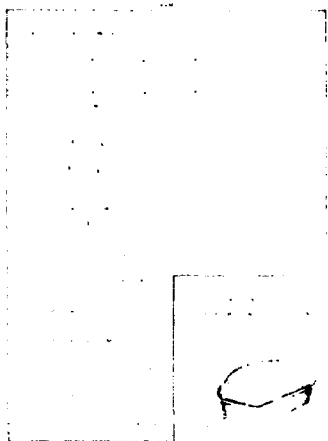
MATERIALS

Worksheet 4-7

Slides 4-28 through 4-31

\*35 mm slide projector

Worksheet 4-7



\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-19. Clues to Success

*This clue to success pertains to cycling and microbial activity. Use the questions to assess the success of your students since the last review.*

Before beginning this activity, turn to the Progress in Following Directions page of the Student Record of Progress. Use the guidelines to rate your students on their ability to follow directions.

Distribute Worksheet 4-7.

Then say:

WE ARE GOING TO HAVE ANOTHER CHANCE TODAY TO PRACTICE FOLLOWING DIRECTIONS. LISTEN CAREFULLY. I WILL REPEAT EACH DIRECTION ONLY ONE TIME.

WRITE YOUR LAST NAME AND THEN YOUR FIRST NAME IN THE UPPER RIGHT-HAND CORNER OF THE WORKSHEET.

NOW, PRINT THE DATE UNDER YOUR NAME JUST AS I PRINT IT ON THE CHALKBOARD.

PUT AN X AT THE CENTER OF THE BOTTOM OF THE PAGE.

NOW WE ARE GOING TO ANSWER SOME QUESTIONS ABOUT CYCLES AND MICROBES.

Project each question separately. Read the first question and choices aloud to the students. Allow ample time for them to mark their worksheets. Repeat each question and choices. Follow the same procedure for the next three questions.

After all students have had the opportunity to answer all of the questions, collect the worksheets. Again project



## TEACHING STRATEGIES

### 19. Clues to Success

o success pertains to cycling and microbial  
Use the questions to assess the success of  
ts since the last review.

During this activity, turn to the Progress in  
Directions page of the Student Record of  
Use the guidelines to rate your students  
Ability to follow directions.

Worksheet 4-7.

GOING TO HAVE ANOTHER CHANCE TODAY TO  
THE FOLLOWING DIRECTIONS. LISTEN  
FULLY. I WILL REPEAT EACH DIRECTION  
ONE TIME.

YOUR LAST NAME AND THEN YOUR FIRST  
IN THE UPPER RIGHT-HAND CORNER OF THE  
SHEET.

PRINT THE DATE UNDER YOUR NAME JUST AS I  
T ON THE CHALKBOARD.

X AT THE CENTER OF THE BOTTOM OF THE

ARE GOING TO ANSWER SOME QUESTIONS  
CYCLES AND MICROBES.

question separately. Read the first question  
aloud to the students. Allow ample time for  
their worksheets. Repeat each question  
Follow the same procedure for the next  
ons.

Students have had the opportunity to answer all  
ions. collect the worksheets. Again project

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- answer the four questions on the worksheet
- participate in group discussion of answers on the worksheet.

## MATERIALS

Slide 4-28, Question 1

Slide 4-29, Question 2

Slide 4-30, Question 3

Slide 4-31, Question 4

## TEACHING STRATEGIES

each slide and discuss the answers with them. Encourage them to defend their choices. After class, tally the students' answers on Tallysheet 4-6. Consider whether the whole class needs further review, or if a few individuals need special attention, and make adjustments accordingly.

Then proceed to the next core.

### Interpreting and Scoring

Item 1 tests the student's understanding of the word cycle by his choice of C circled on the worksheet.

Items 2 and 3 assess the concept that microbes are living. The student should answer correctly both items.

Item 4 emphasizes the concept that some microbes are helpful and necessary. The baked bread experiment is used as a practical application of this concept.

Review previous activities as necessary to help each student understand these concepts.

### Using the Tallysheet:

Turn to the Concepts page of the Student Record of Progress and find the column marked "Activity 4-19, Cycle." Circle YES if the student marked the correct choice to question one on the worksheet. Otherwise, circle NO.

Find the column marked "Activity 4-19, Living Microbes." Circle YES if the student answered both questions two and three correctly. Otherwise, circle NO.

Find the column marked "Activity 4-19, Helpful Microbes." Circle YES if the student marked the correct choice. Otherwise, circle NO.

## TEACHING STRATEGIES

Discuss the answers with them. Encourage their choices. After class, tally the results on Tallysheet 4-6. Consider whether students need further review, or if a few need special attention, and make adjustments accordingly.

the next core.

### Scoring

Assess student's understanding of the word "core" of C circled on the worksheet.

Assess the concept that microbes are everywhere. Students should answer correctly both

the concept that some microbes are harmful. The baked bread experiment is a practical application of this concept.

Activities as necessary to help each student understand these concepts.

### Set:

On the page of the Student Record of the column marked "Activity 4-19," mark YES if the student marked the correct answer on the worksheet. Otherwise,

mark "Activity 4-19, Living Microbes." If the student answered both questions correctly, mark YES. Otherwise, circle NO.

Mark "Activity 4-19, Helpful Microbes." If the student marked the correct choice, mark YES. Otherwise, circle NO.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-19

**MATERIALS**

**TEACHING STRATEGIES**

Turn to the Progress in Following Directions page of the Student Record of Progress. Three directions were given to students: 1) to write their last name first in upper right-hand corner, 2) to print the date exactly as shown on the board, 3) to mark an X at bottom center of the worksheet. Circle YES if all three directions were correctly followed. Circle NO if none of the three directions were followed. Circle PART for the remaining students to indicate partial ability to follow directions.

Turn to the Responsibility and Involvement page of the Student Record of Progress. Using the guidelines, rate each student's involvement in science.

## TEACHING STRATEGIES

Progress in Following Directions page of Record of Progress. Three directions were given: 1) to write their last name first in the top-left-hand corner, 2) to print the date exactly in the top-right-hand corner, 3) to mark an X at bottom center of the page. Circle YES if all three directions were followed. Circle NO if none of the directions were followed. Circle PART for the students to indicate partial ability to follow

Responsibility and Involvement page of the Record of Progress. Using the guidelines, rate each student's involvement in science.

## ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student should, as a minimum:*

- have answered the four questions on Worksheet 4-7*
- have participated in a discussion of the worksheet*

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. Did any students defend their answers? ☐ No ☐ Yes. Who? \_\_\_\_\_ What were their arguments?
13. Were any questions on Worksheet 4-7 unsatisfactory? ☐ No ☐ Yes  
Which ones? \_\_\_\_\_ Explain:
14. What added questions would you suggest for this assessment?

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem: \_\_\_\_\_
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment: \_\_\_\_\_

Specific Questions:

12. Did any students defend their answers? ☐ No ☐ Yes Who? \_\_\_\_\_ What were their arguments?
13. Were any questions on Worksheet 4-7 unsatisfactory? ☐ No ☐ Yes Which ones? \_\_\_\_\_ Explain:
14. What added questions would you suggest for this assessment?
15. Please send in Tallysheet 4-5 and Worksheet 4-7.

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?



B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

1. Was the background information for this core clear and useful? ☐ Yes ☐ No  
Comment:
2. Was there too much preparatory reading and too many directions given to the teacher? ☐ Yes ☐ No  
Comment:
3. Was it clear to you why these particular activities were chosen and the direction they were leading? ☐ Yes ☐ No
4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)
5. Is there a practical (take-home) value for your students in these activities?  
☐ Yes ☐ No If yes, what do you see as the "take-home" lesson? If no, what is needed?
6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?  
☐ Yes ☐ No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? ☐ Yes ☐ No  
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? ☐ Yes ☐ No  
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?

12. Did the activities fulfill the purposes described by the core objectives and rationale? ☐ Yes ☐ No  
Comment:

7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?  
☐ Yes ☐ No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? ☐ Yes ☐ No  
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? ☐ Yes ☐ No  
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? ☐ Yes ☐ No  
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

NEW STUDENTS ENTERING DURING THIS CO

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Tes
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white  
 B = black  
 S = Spanish-  
 American  
 O = other

W=WIS  
 B=Bin  
 O=Oth  
 (Na

STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping

# NEW STUDENTS ENTERING DURING THIS CORE

Group	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
\$ O	M F			W B O				
\$ O	M F			W B O				
\$ O	M F			W B O				
\$ O	M F			W B O				
\$ O	M F			W B O				
\$ O	M F			W B O				

te  
ack  
nish-  
frican  
er

W=WISC  
B=Binet  
O=Other  
(Name)

Reason for Dropping



## Me and my Environment

### UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

#### CORE C. GARBAGE AND MY ENVIRONMENT

##### AIMS FOR ME AND MY ENVIRONMENT

1. DEVELOPMENT IN EACH CHILD OF A SENSE OF IDENTITY AS A PERSON WHO HAS SOME DEGREE OF CONTROL OVER AND CAN ACT ON HIS ENVIRONMENT. This will lead to a degree of self-determination based on a rational coping with situations rather than on a passive compliance or an impulsive response to problems.
  2. DEVELOPMENT IN EACH CHILD OF A SUCCESS SYNDROME. More than anything else, each activity is intended to be a success experience for each child. It is the teacher's responsibility -- almost obligation -- to see that each child succeeds at a level that is challenging to his abilities and that preserves his self-respect. It is a further responsibility of the teacher to point out his achievement. The students as a group should help each individual fit what he has done into a pattern of accomplishment.
  3. DEVELOPMENT IN EACH CHILD OF AN INTEREST THAT COULD BECOME A HOBBY OR AVOCATION OVER A LIFETIME (through an exposure to an array of experiences in science). It is hoped that many children will find some area -- perhaps growing plants, caring for animals, identifying flowers, collecting things, or simply enjoying outings into the country -- that they feel strongly about and can develop some competence or knowledge in. This would provide a means of self-expression, and (perhaps) allow some degree of sharing or involvement with others.
  4. DEVELOPMENT IN EACH CHILD OF A SENSE OF RELATIONSHIP AND EMPATHY WITH OTHER LIVING THINGS. It is hoped that this will lead to a positive regard and caring about what affects them as individuals and as a group, because what affects them affects the community of man.
  5. DEVELOPMENT IN EACH CHILD OF AN UNDERSTANDING OF ENVIRONMENTAL CONDITIONS that will lead to a sense of responsibility for the environment and actions that protect or improve it.
1. Develop an understanding of the
  2. Develop an understanding of cyclical relationship of the materials and
  3. Recognize the role of decomposers
  4. Realize that because certain materials are used to which man uses these materials
  5. Comprehend the role of man as an agent of change in nature.
1. Perceive that garbage (solid waste) is a problem
  2. Recognize the composition of different types of waste
  3. Recognize the need to recycle materials
  4. Identify ways to recycle materials
  5. Realize the positive role microorganisms play in the recycling process

UNIT IV. TRANSFER AND CYCLING OF  
MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT



BSCS

UNIT IV GOALS

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

CORE C OBJECTIVES

1. Perceive that garbage (solid waste) presents a difficult man-made problem.
2. Recognize the composition of daily garbage.
3. Recognize the need to recycle materials.
4. Identify ways to recycle materials.
5. Realize the positive role microbes play in the decomposition process.



## Me and my Environment

UNIT IV. TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

### CORE C RATIONALE

Attention is now focused on what the layman often considers to be the end of energy and material chains -- garbage. In a practical and short-term sense, this is true. To perceive the problem created by man's use and disposal of materials, as well as to realize the necessity for quickly returning the materials to natural or man-made cycles, a study of garbage is important and necessary.

Once there is an acknowledgement that a problem exists, a solution or accommodation to it can be tackled. Awareness, in itself, is a significant goal. It is in this final core of the unit that the student can be given the background and practical knowledge to exert some control over his immediate environment and to modify his behavior to alleviate rather than aggravate the problem. It is here, then, that the concepts of biodegradable, recycling, and composting can be used as a potential basis to make the students aware of their responsibilities in this direction.

BAC

The film *Garb* ESSENTIAL THAT THI IN THE PROPER SEQU is out of the ques or a suitable subs presenting the pro

Activities 4- trash. (Garbage a includes organic m suggest the quanti In making this poi If students separa paper is the large or at home. Inqui materials.

Activity 4-23 recognized that so carried out. If a made, however, the

Activity 4-24 traditional and co enthusiasm during practical way for his understanding.

Groundwork fo Activity 4-25, is during the game wi sense, fortunately where there is no



UNIT IV. TRANSFER AND CYCLING OF  
MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT



BACKGROUND INFORMATION FOR THE TEACHER

The film *Garbage* serves as the basis for Activity 4-20. IT IS ESSENTIAL THAT THIS FILM BE ORDERED WELL IN ADVANCE AND THAT IT BE USED IN THE PROPER SEQUENCE OF ACTIVITIES. If a later trip to the local dump is out of the question, it is doubly important that you show this film or a suitable substitute. The film is designed to have visual impact presenting the problem of trash with a depth seldom thought of.

Activities 4-21 and 4-22 involve weighing and categorizing classroom trash. (Garbage and trash are essentially the same. Garbage generally includes organic matter, i.e., food scraps.) Hopefully this data will suggest the quantities produced by the entire school or by many households. In making this point you should know the population of your school and city. If students separate trash into categories, they will probably find that paper is the largest single component whether it was collected at school or at home. Inquiry should be directed towards recycling some of these materials.

Activity 4-23 is considered an optional activity because it is recognized that school policies may prevent this activity from being carried out. If a trip to the local dump or sanitary landfill can be made, however, the results should indicate that the time was well spent.

Activity 4-24 provides the opportunity for recycling in the more traditional and concrete sense. Spend time on this activity, maintaining enthusiasm during the extended time required, since this is a very practical way for the student to become involved and to demonstrate his understanding.

Groundwork for recycling has been laid. The Recycling Payoff Game, Activity 4-25, is purposely designed so that the person who recycles during the game wins. However true this may be someday in the real sense, fortunately we have not yet reached the crisis state of affairs where there is no alternative but to recycle at any cost.



## Me and my Environment

UNIT IV. TRANSFER AND CYCLING OF  
MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT

### BACKGROUND INFORMATION

Activity 4-26 is significant  
opportunity for recycling  
the recreational aspects

A final review of s  
tional assessment prior

UNIT IV. TRANSFER AND CYCLING OF  
MATERIALS IN MY ENVIRONMENT

CORE C. GARBAGE AND MY ENVIRONMENT



**BSCS**

BACKGROUND INFORMATION FOR THE TEACHER (continued)

Activity 4-26 is similar to Activity 4-24 in that it provides the opportunity for recycling in the more traditional sense. It demonstrates the recreational aspects of recycling.


A final review of success, Activity 4-27, can serve as an instructional assessment prior to the start of the next unit.



## Me and my Environment

### UNIT IV. CORE C.

## PLANNING GUIDE

NOTE: Some activities (indicated in italics and an ) be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Ital)
	Materials You Furnish	Materials in Supply Kit	
4-20. Garbage  Days needed: 1-2	16 mm-Film projector Screen Film: <i>Garbage</i> Media Department Holt, Rinehart and Winston, Inc. 383 Madison Avenue New York, New York 10017		<i>Order this months in time. It \$135.00. sanitation</i>  <i>Contact t out the a in garbag</i>
4-21. Classroom Trash  Days needed: 2	String Plastic bags (garbage or can liner) Masking tape	Spring balance	One ball  Five bags  One per c  <i>Begin col the activ disposal</i>
4-22. Garbage Probe  Days needed: 1	35 mm Slide projector	Slide 4-32 Slide 4-33 Slide 4-34	Overturnee Close-up o Sorted tr

# PLANNING GUIDE



BSCS

Activities (indicated in italics and an arrow in the margin) must be prepared several days or weeks in advance. Use this summary as a teaching and preparation schedule. All supplies needed are listed.


List of Supplies Needed		Notes and Suggestions to Teacher (Italics and Arrow Indicate Advance Preparation Directions)
Item	Materials in Supply Kit	
017		<p><i>Order this film, produced by King Screen Productions, several months in advance to guarantee you have it at the appropriate time. It can be rented for about \$15.00 or purchased for \$135.00. Numerous other film libraries and the local sanitation department may also have the film.</i></p> <p><i>Contact the local sanitation or public works department to find out the amount of money spent and the number of people employed in garbage collection.</i></p>
	Spring balance	<p>One ball strong enough to suspend a 25-pound weight</p> <p>Five bags per class</p> <p>One per class</p> <p><i>Begin collecting trash at least five days prior to teaching the activity. Contact custodian and arrange visit to school disposal facilities.</i></p>
	<p>Slide 4-32</p> <p>Slide 4-33</p> <p>Slide 4-34</p>	<p>Overtaken trash can</p> <p>Close-up of trash</p> <p>Sorted trash</p>




# Me and my Environment

## UNIT IV. CORE C.

## PLANNING GUIDE


NOTE: Some activities (indicated in italics and an  in the be prepared several days or weeks in advance. Use this a teaching and preparation schedule. All supplies need

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Italics and  in the)
	Materials You Furnish	Materials in Supply Kit	
4-23. It's a Real Dump (Optional Activity)  Days needed: 2			<i>This trip should be prepared by the Teacher Prior to planning the trip outlined at lead</i>
4-24. Every Litter Bit Helps  Days needed: 1	Teacher power--Student power		Make any communication outlined.
4-25. The Recycling Payoff  Days needed: 3		Recycling Payoff Game  Worksheet 4-8	One game set per class  Used by student
4-26. Me, Recycling, and Art  Days needed: 2-3	Art Supplies  Various bottles, cans, glass, egg cartons, etc.		Provide art supplies can be recycled  Collected by student
4-27. Clues to Success  Days needed: 1-2	35 mm Slide projector Tape recorder Blank cassette	Worksheet 4-9	

# PLANNING GUIDE



BSCS

activities (indicated in *italics* and an  in the margin) must be completed several days or weeks in advance. Use this summary as a guide and preparation schedule. All supplies needed are listed.


Supplies Needed	Notes and Suggestions to Teacher ( <i>Italics and Arrow Indicate Advance Preparation Directions</i> )
Materials in Supply Kit	
	<i>This trip should be scheduled if at all possible. Read carefully the Teacher Preparation section of this activity for details in planning the trip. Make the contacts and arrangements outlined at least one week in advance.</i>
	Make any community contacts needed to expedite the activities outlined.
Recycling Payoff Game	One game set per four or five students
Worksheet 4-8	Used by student to record game activities
	Provide art supplies only at a minimum where no substitute can be recycled.  Collected by students and teacher to use for recycled art
Worksheet 4-9	



# Me and my Environment

## UNIT IV. CORE C.

## PLANNING GUIDE

NOTE: Some activities (indicated in italics and an  i be prepared several days or weeks in advance. Use a teaching and preparation schedule. All supplies

Activity Number, Page, Tentative Teaching Time	Check List of Supplies Needed		(Ital
	Materials You Furnish	Materials in Supply Kit	
4-27. Clues to Success (continued)		Slide 4-35 Slide 4-36 Slide 4-37 Slide 4-38 Worksheet 4-10	Question Question Question Question Fate of a
4-28. What Do You Think?  Days needed: 2	35 mm Slide projector	Worksheet 4-11 Worksheet 4-12 Worksheet 4-13 Worksheet 4-14 Slide 4-39	Question



# PLANNING GUIDE



**BSCS**

ne activities (*indicated in italics and an ↩ in the margin*) must  
prepared several days or weeks in advance. Use this summary as  
teaching and preparation schedule. All supplies needed are listed.

## st of Supplies Needed

sh Materials in Supply Kit

Notes and Suggestions to Teacher

(*Italics and Arrow Indicate Advance Preparation Directions*)

Slide 4-35  
Slide 4-36  
Slide 4-37  
Slide 4-38  
Worksheet 4-10

Question 1, Clues to Success  
Question 2, Clues to Success  
Question 3, Clues to Success  
Question 4, Clues to Success  
Fate of a Newspaper

Worksheet 4-11  
Worksheet 4-12  
Worksheet 4-13  
Worksheet 4-14  
Slide 4-39

Question 1, What do you think?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

1. Perceive that garbage (solid waste) presents a difficult man-made problem.
2. Recognize the composition of daily garbage.
3. Recognize the need to recycle materials.
5. Realize the positive role microbes play in the decomposition process.

#### ENVIRONMENTAL THEME:

Cyclic Nature of Processes, Finiteness of Resources

#### INQUIRY SKILLS:

Describing

TIVITY

als for the Student:

Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.

Recognize the role of decomposers in the cycling process.

Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.

Comprehend the role of man as an integral part of nature not apart from nature.

Objectives for the Student:

Perceive that garbage (solid waste) presents a difficult man-made problem.

Recognize the composition of daily garbage.

Recognize the need to recycle materials.

Realize the positive role microbes play in the decomposition process.

THEME:

nature of Processes, Finiteness of

s

s:  
ng

UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

CORE C.

GARBAGE AND  
MY ENVIRONMENT

ACTIVITY 4-20. GARBAGE



BSCS



## Me and my Environment

### PROBLEM-SOLVING SKILLS:

Explaining, Defending, Answering Why Questions

### PRACTICAL APPLICATION:

Understand Problems in Garbage Disposal,  
Be Aware of Job Opportunities in Garbage Disposal

### Activity 4-20. Garbage

*A film, Garbage, follows the route trash takes when discarded. It is designed to instill in the viewer a feeling of being inundated in garbage.*

### Teacher Preparation:

1. A visit to the city dump (Activity 4-23) may be impossible in some school districts because of transportation costs, time limitations, or general administrative restrictions. If this is the case you should make every effort to obtain the *Garbage* film and complete this activity. If *Garbage* is not available, *The Garbage Explosion* is an acceptable alternate, or you might be able to locate other appropriate films on the subject.
2. For the class discussion of this film it will be necessary to obtain information about the total amount of money spent by your local government each year on garbage collection and disposal. You will also need to know how many people are employed to carry out these operations. Contact the appropriate office of local government such as

\*Film, *Garbage* (King Screen Production) or *The Garbage Explosion* (Encyclopaedia Britannica)

\*16 mm Film projector

\*Screen

\*Not furnished in materials kit

ING SKILLS:

ing, Defending, Answering Why Questions

PLICATION:

and Problems in Garbage Disposal,  
e of Job Opportunities in Garbage

Garbage

*follows the route trash takes when  
designed to instill in the viewer a  
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ed to know how many people are employed  
these operations. Contact the  
office of local government such as



BSCS

*During this activity, each student should:*

- view the film *Garbage**
- participate in a discussion of the film*
- list scavengers that might be at the dump*
- identify biodegradable and nonbiodegradable  
components of garbage.*

**MATERIALS**

**TEACHING STRATEGIES**

the Department of Public Works or the Sanitary Engineer.

To add visual impact to the following activities you should now show the 11-minute film *Garbage* to the class. It documents one of the routes trash can take when discarded and follows the context of this core very well. It can be purchased from Holt, Rinehart and Winston, Inc., Media Department, 383 Madison Avenue, New York, New York, 10017, for \$135.00. It can be rented for about \$15.00 from the producers or numerous film libraries. Films may also be obtained from the local sanitation department. Be sure to preview the film(s) you plan to use.

Begin the class period by saying:

WE ARE GOING TO SEE A FILM THAT HAS NO WORDS.  
WATCH THE FILM AND TRY TO FIGURE OUT WHAT  
WORDS WOULD GO WITH THE PICTURES.

Do not give any explanation of what is happening. This will allow the students to give unbiased impressions once the projection is completed.

When the film is over, ask:

WHAT IS THE FILM ABOUT?

DO YOU THINK THE FILM IS WELL NAMED?

## TEACHING STRATEGIES

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er.

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ojection is completed.

lm is over, ask:

S THE FILM ABOUT?

THINK THE FILM IS WELL NAMED?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "What happens to garbage," "How much  
garbage people have," "Garbage collection is a  
big business," "Garbage is handled by lots of  
people before it goes to the dump (landfill),"  
"There's more to garbage collecting than I  
thought there was," and so forth.

--indicate that all it showed was garbage, so  
that's a good name for it.

## MATERIALS

## TEACHING STRATEGIES


  
GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND

WHAT ARE SOME OF THE DIFFERENT JOBS PEOPLE HAVE  
IN WORKING WITH GARBAGE?

ASK FOR  
OTHER IDEAS

List student responses on the chalkboard.

(Student's name), HOW MANY MEN DO YOU THINK OUR  
CITY HIRES TO HANDLE GARBAGE?

  
GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND

Write the responses on the chalkboard. After many  
students have made guesses, say:

I CALLED THE (name of place called) AND FOUND  
THAT OUR CITY HAS (number) PEOPLE WORKING WITH  
GARBAGE.

HOW DO YOUR GUESSES COMPARE WITH THIS NUMBER?




## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-20

Students should:

  
**GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND**

OF THE DIFFERENT JOBS PEOPLE HAVE  
WITH GARBAGE?

--respond, "Garbagemen," "Garbage truck driver,"  
"Truck driver," "Truck unloader," "Caterpillar  
driver."

**ASK FOR  
OTHER IDEAS**

ponses on the chalkboard.

(name), HOW MANY MEN DO YOU THINK OUR  
D HANDLE GARBAGE?

--make a variety of guesses.

  
**GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND**

s on the chalkboard. After many  
e guesses, say:

(name of place called) AND FOUND  
HAS (number) PEOPLE WORKING WITH

GUESSES COMPARE WITH THIS NUMBER?

--compare their guesses with the actual number of  
garbage workers.

MATERIALS

TEACHING STRATEGIES

(Student's name), HOW MUCH MONEY DO YOU THINK  
OUR CITY SPENDS EACH YEAR TO HANDLE GARBAGE?

Write these figures on the chalkboard and after many  
students have made guesses, say:

OUR CITY SPENDS (amount of money) EACH YEAR TO  
HANDLE THE GARBAGE.

HOW DOES THAT AMOUNT COMPARE TO OUR GUESSES?

Say to the class:

SOME CITIES IN THE UNITED STATES SPEND MORE  
EACH YEAR GETTING RID OF GARBAGE THAN THEY  
SPEND FOR BOTH FIRE AND POLICE PROTECTION.....  
THE MONEY IS SPENT TO PAY ALL THE PEOPLE WHO  
PICK UP THE GARBAGE, DRIVE THE TRUCKS, WORK  
AT THE DUMP, AND ALSO TO PAY FOR EQUIPMENT,  
GASOLINE, AND FIXING THE EQUIPMENT. SOMETIMES  
THE DUMP MAY BE AS FAR AS FIFTY MILES FROM  
WHERE THE GARBAGE IS PICKED UP.

WHAT WAS THE MAN DRIVING THE TRACTOR WEARING  
ON HIS FACE?

If the students did not notice the mask,  
tell them that he was wearing a mask and  
then ask:

WHY WAS HE WEARING A MASK?

WHY DO DUMPS STINK?

## TEACHING STRATEGIES

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ITY SPENDS EACH YEAR TO HANDLE GARBAGE?

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DOES THAT AMOUNT COMPARE TO OUR GUESSES?

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YEAR GETTING RID OF GARBAGE THAN THEY  
FOR BOTH FIRE AND POLICE PROTECTION.  
ONEY IS SPENT TO PAY ALL THE PEOPLE WHO  
UP THE GARBAGE, DRIVE THE TRUCKS, WORK  
E DUMP, AND ALSO TO PAY FOR EQUIPMENT,  
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If the students did not notice the mask,  
tell them that he was wearing a mask and  
then ask:

AS HE WEARING A MASK?

D DUMPS STINK?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--again make a variety of guesses.

--compare their guesses to the actual figure.

--respond, "Mask," "Don't know," "Can't remember."

--respond, "Dump stinks," "There are microbes  
in the air," "Keep microbes out of his mouth  
and nose."

--respond, "The garbage is rotting or decomposing."

## MATERIALS

## TEACHING STRATEGIES

WHAT IS A MICROBE?

ARE MICROBES THAT LIVE IN THE DUMP HARMFUL  
OR HELPFUL?

(Student's name), WHY DO YOU THINK THAT MICROBES  
IN THE DUMP ARE HARMFUL?

(Student's name), WHY DO YOU THINK THAT MICROBES  
IN THE DUMP ARE HELPFUL?

Encourage the students to defend their answers and discuss  
other points of view.

Then say:

BOTH HARMFUL AND HELPFUL MICROBES LIVE IN THE  
DUMP.

WHAT ELSE MIGHT YOU SEE EATING THE GARBAGE IN  
THE DUMP?

WHAT DO WE CALL ALL THESE ANIMALS?

If the words scavenger and pest do not  
come up, remind the students of the  
slides on scavengers.

Then ask:

WHY ARE THESE ANIMALS SOMETIMES CALLED PESTS?

## TEACHING STRATEGIES

MICROBE?

THAT LIVE IN THE DUMP HARMFUL

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ARE HARMFUL?

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on scavengers.

E ANIMALS SOMETIMES CALLED PESTS?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-20

Students should:

--recall experiences in Core A of Unit II and  
Core B of Unit IV and give statements such as,  
"Living things we can't see," "Living things  
that decompose biodegradable substances," "We  
call some of them germs," "Things that rot  
garbage."

--respond, "Harmful," "Helpful," "Don't know."

--respond, "They make you sick," "They're bad."

--respond, "They help rot the garbage," "They  
break things up," "They decompose things."

--respond, "Rats," "Mice," "Cockroaches."

--respond, "Scavengers," "Pests," or possibly,  
"Decomposers."

--respond, "Something we don't like," "Things that  
are harmful," "Animals that carry disease," "They  
bite," "They're dirty."

**MATERIALS**

**TEACHING STRATEGIES**

Ask students what pests they might expect to find around garbage and list them on the chalkboard. Point out that these pests might be present anywhere that there is garbage which would include the home, street, and so forth.

IN WHAT WAY COULD THESE PESTS BE HELPFUL?

Then say:

BECAUSE THESE PARTICULAR SCAVENGERS ARE GENERALLY CONSIDERED UNPLEASANT, MAN USUALLY TRIES TO GET RID OF THEM. HOW DO WE GET RID OF THESE PESTS?

Say:

LET'S LOOK AT THE FILM AGAIN AND THIS TIME LOOK FOR TWO THINGS: FIRST, WATCH FOR WAYS TO GET RID OF PESTS, AND SECOND, LOOK FOR THE KINDS OF THINGS THAT GARBAGE IS MADE UP OF.

Show the film again.

Then ask:

WHAT ARE SOME WAYS WE CAN GET RID OF GARBAGE PESTS?

WHAT THINGS MADE UP THE GARBAGE IN THE FILM?

AS  
OTH

## TEACHING STRATEGIES

What pests they might expect to find around  
list them on the chalkboard. Point out that  
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FOR TWO THINGS: FIRST, WATCH FOR WAYS TO GET  
RID OF PESTS, AND SECOND, LOOK FOR THE KINDS  
OF THINGS THAT GARBAGE IS MADE UP OF.

Film again.

ARE THERE SOME WAYS WE CAN GET RID OF GARBAGE

## ASK FOR OTHER IDEAS

WHAT THINGS MADE UP THE GARBAGE IN THE FILM?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--suggest pests such as flies, cockroaches, rats,  
mice, ants, worms, and so forth.

--respond, "They could break things down," "Eat  
garbage," and so forth.

--respond, "Kill them," "Shoot them," "Spray them."

--respond, "Use cans for storage," "Tight fitting  
lids on cans," "Bury garbage," "Spray," "Keep  
garbage picked up."

--suggest such things as food, tires, refrigerators  
clothes, paper, and so forth.

## MATERIALS

## TEACHING STRATEGIES

WHICH THINGS THAT YOU SAW IN THE DUMP WILL ROT OR DECOMPOSE?

List on the chalkboard those things that will decompose easily.

WHAT IS THE WORD THAT MEANS DECOMPOSE?

On the chalkboard write "biodegradable" by the items listed.

Then ask:

WHICH THINGS DID YOU SEE IN THE FILM THAT WILL NOT DECOMPOSE?

Make a second list on the chalkboard.

WHO REMEMBERS THE WORD THAT MEANS THINGS DO NOT DECOMPOSE?

Write "nonbiodegradable" by the second list.

WHAT WILL HAPPEN TO THE THINGS THAT ARE NONBIODEGRADABLE?

WHICH THINGS SEEN IN THE FILM DO WE HAVE BURIED IN OUR COMPOST?

On the chalkboard, circle the words that are included in the class compost pile. Conclude the activity by saying:



## TEACHING STRATEGIES

THAT YOU SAW IN THE DUMP WILL ROT

board those things that will decompose

WORD THAT MEANS DECOMPOSE?

write "biodegradable" by the items

DID YOU SEE IN THE FILM THAT WILL  
?

on the chalkboard.

THE WORD THAT MEANS THINGS DO

able" by the second list.

OPEN TO THE THINGS THAT ARE  
BLE?

SEEN IN THE FILM DO WE HAVE BURIED  
?

circle the words that are included in  
pile. Conclude the activity by

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-20

Students should:

--name those things that will rot, such as  
lettuce, cabbage, grass clippings, meat scraps,  
bones, hair, and so forth.

--recall the word biodegradable.

--list those things that will not rot such as  
metal, rubber, plastic, and so forth.

--recall the word nonbiodegradable.

--respond, "Make a mess," "Stay there."

--list the items they have buried that are like  
those in the film.

**MATERIALS**

**TEACHING STRATEGIES**

WHAT WOULD HAPPEN IF THE GARBAGE MEN WENT ON STRIKE?

WHAT COULD YOU DO IN YOUR HOME IF THERE WAS A STRIKE?

DO YOU THINK GARBAGE WORKERS ARE IMPORTANT TO US?

WHY?

## TEACHING STRATEGIES

WHAT WOULD HAPPEN IF THE GARBAGE MEN WENT ON  
VACATION?

WHAT COULD YOU DO IN YOUR HOME IF THERE WAS  
NO TRASH CAN?

DO YOU THINK GARBAGE WORKERS ARE IMPORTANT TO  
OUR SOCIETY?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--predict, "Garbage will pile up," "Be a mess,"  
"Really get to stinking things up."

--reply, "Bury the stuff so it wouldn't stink up  
the place," "Make a compost," "Don't let it get  
thrown around."

--respond, "Yes."

--give a variety of answers, such as, "Garbage is  
hard to get rid of," "Everything would get to  
stinking if they didn't pick it up."

*Upon completion of this activity, each student  
should, as a minimum:*

- have viewed the film Garbage*
- have participated in a discussion of the film.*

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_ Tally \_\_\_\_ Rev \_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes      Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile      ☐ Of value--needs the      ☐ Worth salvaging--make      ☐ Worthless  
                                  --keep as is      revision suggested      major changes described      --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. Was there any difficulty in obtaining the film?      No      Yes      Did you use any other film in place of "Garbage"?      No      Yes      Was it satisfactory and would you recommend the BSCS staff view it for possible use? ☐ No ☐ Yes  
Specify title and source:

Describe the film:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:
- |                                     |  |  |                                    |
|-------------------------------------|--|--|------------------------------------|
| <input type="checkbox"/> Worthwhile | <input type="checkbox"/> Of value--needs the | <input type="checkbox"/> Worth salvaging--make | <input type="checkbox"/> Worthless |
| --keep as is                        | revision suggested                           | major changes described                        | --drop it                          |

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

#### Specific Questions:

12. Was there any difficulty in obtaining the film? No Yes Did you use any other film in place of "Garbage"? No Yes Was it satisfactory and would you recommend the BSCS staff view it for possible use? ☐ No ☐ Yes
- Specify title and source:

Describe the film:

13. How did the students react to seeing the film for a second time?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

1. Perceive that garbage (solid waste) presents a difficult man-made problem.
2. Recognize the composition of daily garbage.

#### ENVIRONMENTAL THEME:

Cyclic Nature of Processes

#### INQUIRY SKILLS:

Comparing

#### PROBLEM-SOLVING SKILLS:

Discussion and Treatment of Group Data,  
Comparing Results

#### PRACTICAL APPLICATION:

Practice Weighing Skills



## ACTIVITY

### Goals for the Student:

- Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
- Comprehend the role of man as an integral part of nature not apart from nature.

### Objectives for the Student:

- Perceive that garbage (solid waste) presents a difficult man-made problem.
- Recognize the composition of daily garbage.

### AL THEME:

Nature of Processes

### LLS:

ing

### IVING SKILLS:

sion and Treatment of Group Data,  
ing Results

### PLICATION:

ce Weighing Skills

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE C.

GARBAGE AND  
MY ENVIRONMENT

## ACTIVITY 4-21. CLASSROOM TRASH



BSCS

**MATERIALS**

Spring balance

\*String

\*Plastic bags, garbage can liners

\*Masking tape

\*Not furnished in materials kit

**TEACHING STRATEGIES**

Activity 4-21. Classroom Trash

*Man is a garbage maker. The quantity and variety of material thrown away each day by the average person is rather impressive. This activity will give the student the opportunity to examine both the contents and volume of the garbage that accumulates as a result of everyday activities. From this background some of the impact that garbage has on man can be understood and appreciated.*

Teacher Preparation:

At least five days prior to the beginning of this activity, begin collecting at the end of each day the trash that accumulates in the classroom wastebasket(s). If possible, solicit student help in the collecting. As trash is placed in plastic bags, have students notice what kinds of things were thrown away. Empty the wastebasket(s) into a plastic garbage bag, tie the bag with string, or a twister, and attach a masking tape label on which is written the date and day of the week. Set the bag aside with a note to the custodian that the bag is not to be disposed of. Students will undoubtedly question the reason for doing this. Maintain their interest by simply telling them the bags will be used in an activity the following week.

Contact the custodian and make arrangements to have students visit the school's trash disposal facilities later in this activity. Indicate to the custodian that you would like him to explain to your class the procedures followed in disposing of school trash and garbage and answer questions that students may have.

Begin the activity by directing the students' attention to the five bags of wastepaper collected during the previous week.

WHAT IS IN THESE BAGS?

## TEACHING STRATEGIES

### -21. Classroom Trash

garbage maker. The quantity and variety of thrown away each day by the average person is excessive. This activity will give the student opportunity to examine both the contents and volume of garbage that accumulates as a result of everyday life. From this background some of the impact that trash on man can be understood and appreciated.

#### Preparation:

Five days prior to the beginning of this activity begin collecting at the end of each day the trash that accumulates in the classroom wastebasket(s). Before the end of the week, solicit student help in the collecting. As trash is placed in plastic bags, have students notice the types of things that were thrown away. Empty the wastebasket(s) into a plastic garbage bag, tie the bag with a rubber band, or a twister, and attach a masking tape label which is written the date and day of the week. Put the bag aside with a note to the custodian that the trash is to be disposed of. Students will undoubtedly ask the reason for doing this. Maintain their interest by simply telling them the bags will be used in the activity the following week.

Ask the custodian to make arrangements to have a representative visit the school's trash disposal facilities during this activity. Indicate to the custodian that you would like him to explain to your class the proper procedure followed in disposing of school trash and garbage and answer questions that students may have.

Conclude the activity by directing the students' attention to the bags of wastepaper collected during the week.

WHAT IS IN THESE BAGS?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- assist in the collection of classroom trash during a period of one week
- help to weigh the collected trash
- relate the class's accumulation of trash to the total daily amount produced by the school.

Students should:

- respond, "Our waste paper," "The stuff we throw away," "Trash."

## MATERIALS

## TEACHING STRATEGIES

DO YOU THINK THIS IS A LOT OF TRASH FOR ONE WEEK FROM JUST ONE ROOM IN THE SCHOOL?

WHAT KINDS OF TRASH DO WE HAVE IN OUR CLASSROOM?

WHAT IS MOST OF THE TRASH MADE OF?

HOW MUCH DO YOU THINK ALL THIS TRASH WEIGHS?

Record the students' guesses on the chalkboard.

Then ask:

HOW COULD WE FIND OUT FOR SURE HOW MUCH IT WEIGHS?

Hold up the spring scale and say:

THIS IS ONE KIND OF SCALE USED TO WEIGH THINGS. TO WEIGH THINGS ON THE SCALE YOU HANG THE ITEM FROM THE HOOK ON THE BOTTOM AND SEE HOW FAR THE NEEDLE ON THE SCALE GOES DOWN.

Demonstrate the use of the spring balance by weighing one of the bags of garbage. Loop the string that is tied to the bag of garbage around the hook on the spring balance. Make certain that the string is looped several times so that it will not break when the garbage is suspended. If the quantity of garbage is large, it would be best to divide it into two garbage bags.

DEMONSTRATION



## TEACHING STRATEGIES

THIS IS A LOT OF TRASH FOR  
JUST ONE ROOM IN THE SCHOOL?  
OF TRASH DO WE HAVE IN OUR CLASSROOM?  
OF THE TRASH MADE OF?  
YOU THINK ALL THIS TRASH WEIGHS?  
ts' guesses on the chalkboard.

FIND OUT FOR SURE HOW MUCH IT

g scale and say:

KIND OF SCALE USED TO WEIGH THINGS.  
NGS ON THE SCALE YOU HANG THE ITEM  
K ON THE BOTTOM AND SEE HOW FAR  
N THE SCALE GOES DOWN.

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f garbage around the hook on the  
Make certain that the string is looped  
that it will not break when the  
ed. If the quantity of garbage is  
e best to divide it into two garbage

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-21

Students should:

- express their opinions on the amount of trash.
- respond, "Paper," "Pencils," "Bags," "Lunches,"  
and so forth.
- probably respond, "Paper."
- respond with a variety of guesses.
  
- respond, "Weigh it," "Use a scale."

DEMONSTRATE



MATERIALS

TEACHING STRATEGIES

Say:

LET'S HOOK THE GARBAGE BAGS ON THE SCALE AND  
WEIGH THEM.



Select two students to weigh each bag - one to hold the scale, the other to hook the bag to the scale. Have each pair come to the front of the room, weigh, and record the weight on the chalkboard.

When all the bags have been weighed and recorded, ask:

HOW CAN WE FIND OUT HOW MUCH ALL THE BAGS  
WEIGH TOGETHER?

WHO CAN ADD THESE NUMBERS TO GIVE US A TOTAL  
WEIGHT?

Select a volunteer to go to the chalkboard and do the arithmetic. Encourage other students to check his work. Compare the total weight to the list of guesses and praise the student with the closest guess.

Think of a teacher next door or across the hall that the students know and ask:

DO YOU SUPPOSE (teacher's name)'S WASTEBASKET  
IS AS FULL AS OURS AT THE END OF THE DAY?

Continue by asking similar questions about other rooms in the school, such as the home economics room, shop, typing room, and so forth. Help students to realize that trash

## TEACHING STRATEGIES

HOOK THE GARBAGE BAGS ON THE SCALE AND THEM.



students to weigh each bag - one to hold the other to hook the bag to the scale. Have come to the front of the room, weigh, and weight on the chalkboard.

he bags have been weighed and recorded, ask:

CAN WE FIND OUT HOW MUCH ALL THE BAGS TOGETHER?

CAN ADD THESE NUMBERS TO GIVE US A TOTAL IT?

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## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Add up the different bags," "Add the weights."

--raise hands.

--suggest the amount of trash is about the same.

## MATERIALS

## TEACHING STRATEGIES

accumulates to some degree in all rooms of the school as a result of normal daily activities. Be sure to include the lunch room in your questioning.

Ask:

IS THERE A LOT OF TRASH IN THE LUNCH ROOM AFTER LUNCH PERIOD?

HOW OFTEN ARE THE TRASH BARRELS EMPTIED?

WHO EMPTIES THEM?

WHO EMPTIES THE WASTEBASKET IN OUR ROOM?

Then ask:

DO YOU SUPPOSE, THROUGHOUT THE WHOLE SCHOOL, THERE IS A LOT OF WASTE PAPER AND TRASH COLLECTED AT THE END OF EACH DAY?

HOW MUCH?

Don't solicit exact figures or become involved in determining exact amounts. The important thing is for the students to realize that a substantial volume of trash is produced as a result of the activities during a normal school day.

Continue by asking:

WHAT HAPPENS TO ALL THE TRASH AFTER IT IS COLLECTED BY THE CUSTODIAN(S)? WHERE DOES IT GO?



## TEACHING STRATEGIES

me degree in all rooms of the school as  
all daily activities. Be sure to include  
your questioning.

NOT OF TRASH IN THE LUNCH ROOM AFTER  
?

THE TRASH BARRELS EMPTIED?

THEM?

THE WASTEBASKET IN OUR ROOM?

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g:

TO ALL THE TRASH AFTER IT IS  
THE CUSTODIAN(S)? WHERE DOES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-21

Students should:

--respond, "Yes," "Yeah, lots."

--infer that the trash is emptied daily, or  
following each lunch period.

--identify the custodian or helper responsible  
for emptying the barrels.

--again identify the person(s) responsible.

--respond, "Yes."

--infer that there would be a considerable amount.

--relate or speculate about the fate of the trash  
and respond, "A truck collects it," "I don't  
know."

**MATERIALS**

**TEACHING STRATEGIES**

WHO COULD TELL US WHAT HAPPENS TO IT?

If the students are not acquainted with the custodian, say:

LET'S FIND OUT FROM (custodian's name),  
THE SCHOOL CUSTODIAN.

Escort the students to the place in your school where the trash is disposed of. Invite the custodian into your classroom. Have the custodian explain the procedures he follows in getting rid of the trash and how much trash accumulates at the end of a day, after special activities such as ball games, after lockers are cleaned, and so forth.

Encourage the students to ask questions. Conclude the activity by asking:

WHAT HAPPENS TO THE TRASH AFTER IT LEAVES THE  
SCHOOL?

See Change of Pacers 23, 24, 25, and 26.

## TEACHING STRATEGIES

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HAPPENS TO THE TRASH AFTER IT LEAVES THE L?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--name or identify the school custodian.

--speculate about the next step in trash disposal procedures and respond, "It gets burned," "It goes to the dump," "They bury it."

*Upon completion of this activity, each student should, as a minimum:*

--have helped collect and weigh the class trash  
--have observed and/or listened to an explanation of what happens to trash collected in the school.



CHANGE OF PACER

of Pacers 23, 24, 25, and 26.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes      Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile      ☐ Of value--needs the      ☐ Worth salvaging--make      ☐ Worthless  
    --keep as is      revision suggested      major changes described      --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. How did the students react to the volume of trash they determined was created in a school?

Did the bags of trash create interest in the activity? ☐ Yes ☐ No  
Discuss:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
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Specific Questions:

12. How did the students react to the volume of trash they determined was created in a school?
13. Did the bags of trash create interest in the activity? ☐ Yes ☐ No  
Discuss:

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

1. Perceive that garbage (solid waste) presents a difficult man-made problem.
2. Recognize the composition of daily garbage.

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Cyclic Nature of Processes

#### INQUIRY SKILLS:

Associating (seeing relationships)

#### PROBLEM-SOLVING SKILLS:

Organizing Data

#### PRACTICAL APPLICATION:

Communication Skills



ACTIVITY

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Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.

Comprehend the role of man as an integral part of nature not apart from nature.

Objectives for the Student:

Perceive that garbage (solid waste) presents a difficult man-made problem.

Recognize the composition of daily garbage.

THEME:

Relationships of Environmental Components, Nature of Processes

AS:

ing (seeing relationships)

NG SKILLS:

ing Data

LICATION:

ation Skills

UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

CORE C.

GARBAGE AND  
MY ENVIRONMENT

ACTIVITY 4-22. GARBAGE PROBE



BSCS

Slides 4-32 through 4-34  
\*35 mm Slide projector  
\*Screen

Activity 4-22. Garbage Probe

*In the last activity the contents and quantity of school trash were examined. This activity extends that examination to solid wastes in the home, distinguishing between biodegradable and nonbiodegradable materials. From this background some of the impact that garbage has on man can be understood.*

Begin the activity by saying:

YESTERDAY WE TALKED ABOUT THE TRASH THAT IS  
THROWN AWAY IN OUR ROOM AND OTHER ROOMS IN  
THE SCHOOL. WHAT KINDS OF THINGS ARE IN  
OUR TRASH?

WHAT KIND OF MATERIAL IS SCHOOL TRASH MOSTLY  
MADE OF?

HOW DOES THE SCHOOL GET RID OF THIS TRASH?

HOW DOES YOUR GARBAGE OR TRASH AT HOME DIFFER  
FROM THE STUFF THROWN AWAY HERE AT SCHOOL?

Now ask :

HOW DOES YOUR FAMILY GET RID OF GARBAGE AT  
HOME?

## TEACHING STRATEGIES

### 22. Garbage Probe

activity the contents and quantity of school examined. This activity extends that to solid wastes in the home, distinguishing degradable and nonbiodegradable materials. background some of the impact that garbage has be understood.

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S YOUR GARBAGE OR TRASH AT HOME DIFFER E STUFF THROWN AWAY HERE AT SCHOOL?

S YOUR FAMILY GET RID OF GARBAGE AT

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- view Slides 4-32 through 4-34
- suggest categories that garbage could be sorted into
- help group a garbage sample into various categories
- trace the source of all the categories listed
- recognize that some garbage materials break down and some do not
- suggest materials in the garbage that could be reused.

Students should:

- name such items as, "Paper," "Broken pencils," "Wood scraps," "Old notebooks," "Food," "Candy wrappers," "Sunflower seeds."
- identify paper and paper products as the most common ingredient, although other materials may be mentioned.
- recall what was observed and said when talking with the school custodian.
- describe items more commonly found at home such as bottles, cans, newspapers, magazines, broken toys, leftover food, clothing, and so forth.
- respond, "Throw it in the garbage can," "Run it down the sink," "Burn it."

## MATERIALS

## TEACHING STRATEGIES

In order to begin making distinctions between the many components of home garbage ask:

HOW DOES YOUR FAMILY GET RID OF OLD PAPER?

WHAT DO YOU DO WITH CANS AND BOTTLES?

WHAT HAPPENS TO FOOD THAT IS LEFT OVER?

Then say:

WE'VE BEEN TALKING ABOUT THE KINDS OF THINGS FOUND IN OUR GARBAGE AND WHAT HAPPENS TO THEM. LET'S LIST THE KINDS OF THINGS WE MIGHT FIND IN OUR GARBAGE.

Allow students to create their own categories for separating the garbage. List the categories on the chalkboard. The following categories will probably be suggested:

Plastic and rubber  
Metal  
Paper, wood, and cloth  
Glass  
Food (in plastic bags)  
Other (questionable and rare products)

Project Slide 4-32 and say:

GIVE SEVER  
STUDENTS A C  
TO RESPON

Slide 4-32



## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-22

Students should:

--respond, "Throw it away," "Put it in the trash,"  
"Save it for a paper drive."

--respond, "Throw them away," "Throw them in the  
garbage," "Take bottles back to the store."

--respond, "Throw it away," "Put it in the disposal,"  
"Feed it to our dog."

  
GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND

in making distinctions between the many  
ome garbage ask:

OUR FAMILY GET RID OF OLD PAPER?

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l rubber

, and cloth

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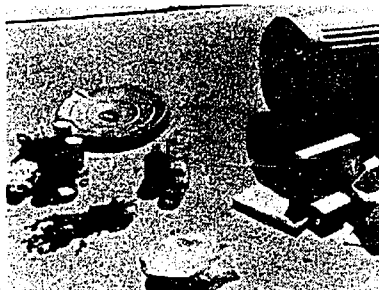
tionable and rare products)

32 and say:

Slide 4-33



Slide 4-34



HERE IS A TRASH CAN WITH GARBAGE THAT ONE FAMILY THREW AWAY IN ONE DAY.

WHAT IS IN THE GARBAGE?

Project Slide 4-33 and say:

HERE IS A CLOSER LOOK AT WHAT IS IN THE TRASH CAN.

LET'S TRY TO SEPARATE THIS GARBAGE INTO GROUPS SIMILAR TO THE WAY WE'VE LISTED THEM ON THE CHALKBOARD.

On the chalkboard, make headings of "PAPER," "GLASS," "FOOD," "METAL," and any other groupings the class suggested. Have the students look at the slide picturing the garbage and list each item in the garbage pile under the proper heading.

When students have finished, project Slide 4-34, which pictures the garbage sorted into piles of paper, metal, glass, rubber and plastic, food, and other. Compare the way the class grouped the items in Slide 4-33 to the grouping on Slide 4-34. Discuss why each item was placed under the headings.

When the discussion of the grouping is complete, ask:

WHAT MATERIALS DO WE HAVE THE MOST OF IN OUR GARBAGE?

WHERE DO WE GET THIS MATERIAL FROM?

## TEACHING STRATEGIES

IS A TRASH CAN WITH GARBAGE THAT ONE  
THREW AWAY IN ONE DAY.

IS IN THE GARBAGE?

Slide 4-33 and say:

IS A CLOSER LOOK AT WHAT IS IN THE TRASH

TRY TO SEPARATE THIS GARBAGE INTO  
SIMILAR TO THE WAY WE'VE LISTED  
ON THE CHALKBOARD.

Chalkboard, make headings of "PAPER," "GLASS,"  
"METAL," and any other groupings the class  
wants. Have the students look at the slide picturing  
the trash and list each item in the garbage pile under  
the heading.

When they have finished, project Slide 4-34, which  
shows the garbage sorted into piles of paper, metal,  
glass and plastic, food, and other. Compare the  
groups grouped the items in Slide 4-33 to the  
Slide 4-34. Discuss why each item was  
placed under the headings.

When discussion of the grouping is complete, ask:

WHAT MATERIALS DO WE HAVE THE MOST OF IN OUR  
TRASH?

DO WE GET THIS MATERIAL FROM?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--describe the contents of the trash can  
mentioning such things as bottles, cans,  
paper, and so forth.

--examine the piles in the slide and identify the  
most common material in their garbage.

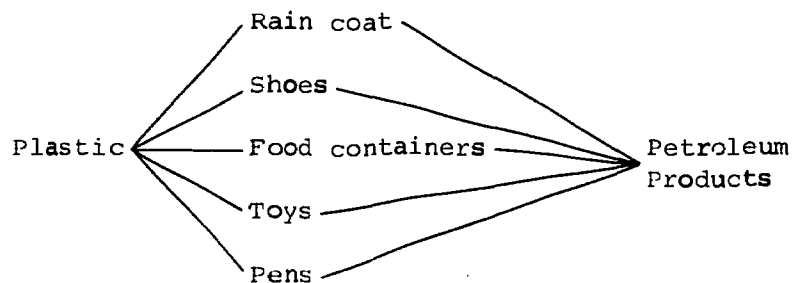
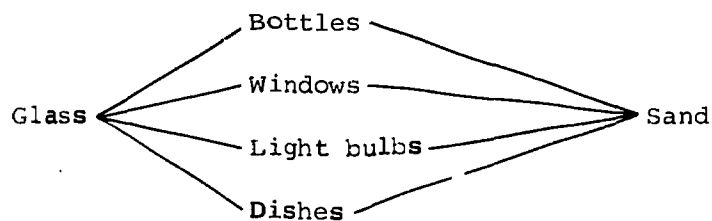
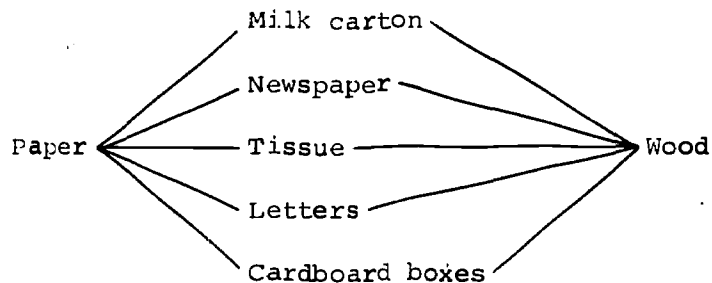
--trace source of the most common category.

## MATERIALS

## TEACHING STRATEGIES

As with the school trash, the most common category will probably be paper. The categories students are most likely not to know will be plastics (petroleum products) and glass (sand). Trace with your students the source of all the categories.

Examples:





## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-22

1 trash, the most common category will  
The categories students are most  
will be plastics (petroleum products)  
Trace with your students the source  
ries.

Milk carton

Newspaper

Tissue

Letters

Cardboard boxes

Wood

Bottles

Windows

Light bulbs

Dishes

Sand

Rain coat

Shoes

Food containers

Toys

Pens

Petroleum  
Products

Then say:

IF ALL PEOPLE IN THE UNITED STATES USE THIS MUCH (most common category - paper) IN A DAY, WHAT WILL HAPPEN EVENTUALLY?

IF WE KEEP USING THIS MUCH (paper) EVERY DAY, WHAT WILL HAPPEN TO OUR (paper) SUPPLY?

WHAT CAN WE DO SO THIS WILL NOT HAPPEN?

CAN ANY OF THESE THINGS (point to the list of categories) BE USED AGAIN?

WHICH ONES WOULD BE THE EASIEST TO USE AGAIN?

IF WE THROW OUR GARBAGE OUT, WHERE DOES IT GO?

Point to the list on the chalkboard.

WHAT WILL HAPPEN TO THESE MATERIALS IN THE DUMP?

WHAT THINGS DID NOT CHANGE VERY MUCH AT ALL IN OUR COMPOST PILE?

Point to the list on the chalkboard.

HOW ARE THESE MATERIALS LIKE THE ONES WE BURIED IN OUR COMPOST?

EVENTUALLY, WHAT WILL HAPPEN TO SOME OF THE MATERIALS IN THE DUMP?

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--respond, "Garbage will build up."

--infer that we will run out of that material.

--respond, "Use less," "Use it over again."

--respond, "Yes."

--identify things such as bottles, bags, and cans that can be used again.

--respond, "To the dump," "Garbage truck."

--predict the fate of each material.

--probably state that the piece of glass, metal bottle cap, and piece of plastic remained unchanged when compared with the rest of the materials.

--identify similar materials.

--on the basis of their experience with the compost, predict that some will decompose and others will not.

ALL PEOPLE IN THE UNITED STATES USE THIS  
(most common category - paper) IN A DAY,  
WILL HAPPEN EVENTUALLY?

IF WE KEEP USING THIS MUCH (paper) EVERY DAY,  
WILL HAPPEN TO OUR (paper) SUPPLY?

CAN WE DO SO THIS WILL NOT HAPPEN?

ANY OF THESE THINGS (point to the list of  
categories) BE USED AGAIN?

WHICH ONES WOULD BE THE EASIEST TO USE AGAIN?

IF WE THROW OUR GARBAGE OUT, WHERE DOES IT GO?

What will happen to the list on the chalkboard.

WHAT WILL HAPPEN TO THESE MATERIALS IN THE

COMPOST PILE?  
THINGS DID NOT CHANGE VERY MUCH AT ALL  
OR COMPOST PILE?

What will happen to the list on the chalkboard.

ARE THESE MATERIALS LIKE THE ONES WE  
FOUND IN OUR COMPOST?

USUALLY, WHAT WILL HAPPEN TO SOME OF THE  
MATERIALS IN THE DUMP?

## MATERIALS

## TEACHING STRATEGIES

  
GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND

WHAT CAUSED SOME OF OUR COMPOST MATERIALS TO  
BREAK DOWN?

Then say:

CAN ANYONE REMEMBER WHAT WE CALL THINGS THAT  
ARE BROKEN DOWN BY DECOMPOSERS?

Write "biodegradable" on the chalkboard.

LET'S LIST SOME OTHER THINGS THAT ARE BROKEN  
DOWN BY DECOMPOSERS.

Write the term "nonbiodegradable" on the chalkboard.

Ask:

IF BIODEGRADABLE MEANS THINGS BROKEN DOWN BY  
DECOMPOSERS, WHAT DOES NONBIODEGRADABLE MEAN?


WHAT ARE SOME OTHER THINGS THAT ARE NOT  
BROKEN DOWN BY DECOMPOSERS?

SINCE SOME THINGS IN GARBAGE DO NOT DECOMPOSE  
VERY FAST, WHAT COULD BE DONE TO KEEP THEM  
OUT OF THE GARBAGE?

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-22

  
**GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND**

Students should:

SOME OF OUR COMPOST MATERIALS TO

--recall that microbes, scavengers, and decomposers break down certain materials.

REMEMBER WHAT WE CALL THINGS THAT  
DOWN BY DECOMPOSERS?

--recall the term biodegradable.

able" on the chalkboard.

SOME OTHER THINGS THAT ARE BROKEN  
COMPOSERS.

--suggest things such as paper, food wastes, leaves, grass, etc.

nonbiodegradable" on the chalkboard.

DABLE MEANS THINGS BROKEN DOWN BY  
, WHAT DOES NONBIODEGRADABLE MEAN?

--recall the meaning of nonbiodegradable as things that are not broken down by decomposers.

ME OTHER THINGS THAT ARE NOT  
BY DECOMPOSERS?

--suggest such things as glass, pop cans, rubber tires, plastic cups, and so forth.

THINGS IN GARBAGE DO NOT DECOMPOSE  
WHAT COULD BE DONE TO KEEP THEM  
GARBAGE?

--suggest using only decomposable things or reusing things that are nondecomposable.

WHAT MATERIALS IN OUR GARBAGE COULD BE REUSED?

WHAT THINGS THAT DO DECOMPOSE COULD BE USED  
IN PLACE OF THINGS THAT ARE THROWN AWAY AND  
DO NOT DECOMPOSE?

The questions at the end of this activity are by no means exhaustive or complete. They are merely introductory to Activity 4-23, which will shed more light on the garbage problem.

TOMORROW WE WILL GO TO THE DUMP AND SEE IF WE  
MIGHT FIND ANSWERS TO SOME OF OUR QUESTIONS  
ABOUT GARBAGE.

See Change of Pacer 27.

GIVE  
STUDENTS  
TO

CHANGE

## TEACHING STRATEGIES

MATERIALS IN OUR GARBAGE COULD BE REUSED?

THINGS THAT DO DECOMPOSE COULD BE USED  
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HOW WE WILL GO TO THE DUMP AND SEE IF WE  
FIND ANSWERS TO SOME OF OUR QUESTIONS  
GARBAGE.

  
**GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND**

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--identify such things as plastic bags, bottles,  
etc.

--suggest the use of paper instead of plastics  
or glass.

*Upon completion of this activity, each student  
should, as a minimum:*

- have participated in the grouping of garbage  
into appropriate categories*
- be able to describe some categories of materials  
found in garbage.*

  
**CHANGE OF PACER**

of Pacer 27.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
                   --keep as is           revision suggested           major changes described           --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Could students identify the source of the items?

Which students do not remember the terms "biodegradable" and "nonbiodegradable" from one day to the next?



8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:
- |                                     |  |  |                                    |
|-------------------------------------|--|--|------------------------------------|
| <input type="checkbox"/> Worthwhile | <input type="checkbox"/> Of value--needs the | <input type="checkbox"/> Worth salvaging--make | <input type="checkbox"/> Worthless |
| --keep as is                        | revision suggested                           | major changes described                        | --drop it                          |
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Could students identify the source of the items?
13. Which students do not remember the terms "biodegradable" and "nonbiodegradable" from one day to the next?
14. Which students can tell in their own words what "biodegradable" and "nonbiodegradable" mean?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

Concern (or questions) about content:

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature, not apart from nature.

##### Core C Objectives for the Student:

1. Perceive that garbage (solid waste) presents a difficult man-made problem.
2. Recognize the composition of daily garbage.

#### ENVIRONMENTAL THEME:

Cyclic Nature of Processes

#### INQUIRY SKILLS:

Observing, Identifying, Inferring

#### PROBLEM-SOLVING SKILLS:

Asking Questions

#### PRACTICAL APPLICATION:

Exposure to Vocational Opportunities in the Area of Solid Waste Disposal

## ACTIVITY

### Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
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### Objectives for the Student:

- Perceive that garbage (solid waste) presents a difficult man-made problem.
- Recognize the composition of daily garbage.

### AL THEME:

Nature of Processes

### LLS:

ing, Identifying, Inferring

### VING SKILLS:

Questions

### APPLICATION:

re to Vocational Opportunities in  
ea of Solid Waste Disposal

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE C.

GARBAGE AND  
MY ENVIRONMENT

## ACTIVITY 4-23. IT'S A REAL DUMP



BSCS

**MATERIALS**

**TEACHING STRATEGIES**

Activity 4-23. It's a Real Dump

*In this activity students will visit their community's garbage dump, central trash collection site, incinerator, or school trash area. They will gain knowledge of how trash is disposed of in their immediate environment. The value of this experience is that the students are able to see the disposal of garbage firsthand so that they begin to understand the problems of disposing of nonbiodegradable materials.*

Teacher Preparation:

Contact the manager of the city dump, incinerator, collection site, or school trash area or incinerator at least a week before the planned visit. You might wish to have him be present and explain the city operation of garbage disposal either in the classroom before or after the visit, or at the dump the day of the visit. Set a mutually satisfactory date and time for the visit, with an alternate date in case of inclement weather. Call again the day before the visit to confirm the arrangement. If your community has a landfill, the city administration may prefer to use the words "sanitary landfill" instead of "dump" to describe it.

While on the visit students should look for the following kinds of things.

1. The different kinds of garbage brought to the dump.
2. Is the garbage separated and dumped in different areas or not? Why?
3. Is any garbage burned?
4. Is all the garbage burned?

## TEACHING STRATEGIES

### 23. It's a Real Dump

Activity students will visit their community's dump, central trash collection site, incinerator, trash area. They will gain knowledge of how disposed of in their immediate environment. The experience is that the students are able to observe the disposal of garbage firsthand so that they begin to understand the problems of disposing of nonbiodegradables.

#### Preparation:

Call the manager of the city dump, incinerator, site, or school trash area or incinerator a week before the planned visit. You might ask him to be present and explain the city's method of garbage disposal either in the classroom before the visit, or at the dump the day of the visit. Set a mutually satisfactory date and time for the visit, with an alternate date in case of bad weather. Call again the day before the visit to confirm the arrangement. If your community has a landfill, the city administration may prefer to use the term "sanitary landfill" instead of "dump" for the visit.

During the visit students should look for the following things.

1. Different kinds of garbage brought to the dump.

2. Is the garbage separated and dumped in different ways or not? Why?

3. Is any garbage burned?

4. How is the garbage burned?

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- visit the community garbage dump
- participate in a discussion of the experience at the dump
- infer the impact of nonbiodegradable materials on the environment.

## MATERIALS

## TEACHING STRATEGIES

5. What jobs are necessary? What are the responsibilities of each of these jobs?
6. Where is the dump located in relationship to the community? Is it close to the city or far away from it? Why?
7. How many trucks bring garbage to the dump each day?
8. Are there any animals and insects living at the dump? What are they?
9. How does the dump look?
10. How does the dump smell? Why?
11. How is our dump like and unlike the one in the film?
12. How much land is a part of the dump?
13. How much land has already been covered or filled at the dump?
14. What land, if any, is available for new garbage dumps?
15. What is done with the garbage that will rot?
16. What is done with the garbage that will not rot?
17. What things did you see that could have been used again rather than thrown away?
18. Are any materials recycled? How?

Have the list of questions dittoed so that the students can refer to them while on the trip. You may wish to have teams assigned to certain questions or have a contest to see who can answer the most questions. A



## TEACHING STRATEGIES

are necessary? What are the  
ilities of each of these jobs?

the dump located in relationship to the  
Is it close to the city or far away  
Why?

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dump like and unlike the one in the

and is a part of the dump?

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## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-23

ACTIVITY  
4-23

## MATERIALS

## TEACHING STRATEGIES

tape recorder taken on the trip might be used to tape talks and the answers to questions.

The day after the students have been to the dump go over the list on the chalkboard, i.e., garbage jobs, etc., and discuss. Also discuss their experiences, bringing out the preceding suggested items, stressing that many items that are disposed of do not decompose.

See Change of Pacers 28 and 29.

CHANG

## TEACHING STRATEGIES

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ter the students have been to the dump go over on the chalkboard, i.e., garbage jobs, etc., s. Also discuss their experiences, bringing preceding suggested items, stressing that many are disposed of do not decompose.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--infer the impact of nonbiodegradable materials on the environment.

*Upon completion of this activity, each student should, as a minimum:*

- visit the community garbage dump*
- have participated in a discussion of the experience at the dump.*



CHANGE OF PACER

of Pacers 28 and 29.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_\_ Tally \_\_\_\_ Rev \_\_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes      Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile      ☐ Of value--needs the      ☐ Worth salvaging--make      ☐ Worthless  
                                  --keep as is      revision suggested      major changes described      --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. Did you have difficulties in arranging the visit to the garbage dump?  
☐ No ☐ Yes Explain:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Did you have difficulties in arranging the visit to the garbage dump?  
☐ No ☐ Yes Explain:

13. What was the student reaction to visiting the dump?  
Before they went?

After the trip?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

3. Recognize the need to recycle materials.
4. Identify ways to recycle materials.

#### ENVIRONMENTAL THEME:

Cyclic Nature of Processes, Finiteness of Resources

#### INQUIRY SKILLS:

Applying

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task

#### PRACTICAL APPLICATION:

Develop Recycling Habits, Cleaning Up the Environment, Working in a Group



TIVITY

als for the Student:

Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.

Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.

Comprehend the role of man as an integral part of nature not apart from nature.

Objectives for the Student:

Recognize the need to recycle materials.

Identify ways to recycle materials.

L THEME:

Nature of Processes, Finiteness of  
es

LS:

ING SKILLS:

Question and Task

PLICATION:

Recycling Habits, Cleaning Up the  
ment, Working in a Group

UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

CORE C.

GARBAGE AND  
MY ENVIRONMENT

ACTIVITY 4-24. EVERY LITTER  
BIT HELPS



BSCS

Activity 4-24. Every Litter Bit Helps

*Activities in this core stress the problem of solid waste disposal, and specifically the problems brought about by nonbiodegradable materials. It is both appropriate and desirable that the students participate in a cleanup and/or collection project whereby a selected category of waste material is collected for possible reuse. Hopefully, the students will receive a monetary reward for materials collected as an added incentive for reusing waste materials.*

Teacher Preparation:

The interest of your students and your ability to stimulate this interest will, to a large extent, determine the success of whatever project is selected. In any area there should be a number of specific projects from which to choose. Some of these, such as collecting cans and bottles, can be used as money-making projects.

The project you select should be continued for some time, preferably for the remainder of the year. If it is a money-making project, students should be allowed to decide how the money will be used. One popular goal is a trip to a restaurant.

In Activity 4-26 the students will reuse selected waste materials in the construction of something useful or a work of art. In order to have sufficient materials available to carry out this activity, the collection of these materials should be begun at this time also. Refer to Activity 4-26 for suggested projects. You may wish to set aside a box or area in the room where the collected materials can be stored. Ask each person to bring at least one object between now and the beginning of Activity 4-26. You may find it helpful to begin collecting appropriate materials yourself so there will be a variety of things available at the proper time.

## TEACHING STRATEGIES

### 24. Every Litter Bit Helps

*in this core stress the problem of solid waste and specifically the problems brought about by degradable materials. It is both appropriate and possible that the students participate in a cleanup collection project whereby a selected category of material is collected for possible reuse. Hopefully, students will receive a monetary reward for material collected as an added incentive for reusing materials.*

#### Preparation:

Test of your students and your ability to stimulate interest will, to a large extent, determine the success of whatever project is selected. In any area, there should be a number of specific projects from which to choose. Some of these, such as collecting cans and bottles, can be used as money-making projects.

The project you select should be continued for some time, at least for the remainder of the year. If it is a long-term project, students should be allowed to decide what they will be used. One popular goal is a trip to the beach.

Activity 4-26 the students will reuse selected waste materials in the construction of something useful or a project. In order to have sufficient materials to carry out this activity, the collection of materials should be begun at this time also. Activity 4-26 for suggested projects. You should set aside a box or area in the room where the collected materials can be stored. Ask each person to bring at least one object between now and the start of Activity 4-26. You may find it helpful to collect appropriate materials yourself so that there will be a variety of things available at the

## ANTICIPATED STUDENT BEHAVIORS

*During this activity, each student should:*

- participate in a class or individual recycling project*
- recognize the benefits to the environment as a result of cleaning up and/or reusing waste materials.*

## MATERIALS

## TEACHING STRATEGIES

You are the key factor in generating and keeping interest in the project, so be enthusiastic!

Following are suggested projects for this activity. Feel free to participate in any activities you may know of whether or not they are listed. Students may also have suggestions. You may find it expeditious to work in cooperation with any civic groups that already have initiated such projects. Groups that have been involved in the past are the YMCA, Kiwanis, Jaycee's, as well as local and school environmental groups. You may wish to contact one or more of these groups in advance for information and additional suggestions.

### Suggested Projects:

1. \*Collecting aluminum and steel cans
2. \*Collecting glass bottles
3. \*Collecting scrap metal
4. \*Collecting newspapers
5. Cleaning up the school grounds
6. Cleaning up vacant yards
7. Cleaning public grounds and parks
8. Cleaning water shorelines
9. Keeping a stretch of roadway or hiking trails litter free through a periodic patrol

\*These items can usually be returned for money.

### Be creative and enthusiastic!

Keep a record of the amounts of things collected and continue to stress the benefits of such endeavors, especially since they directly influence the students' natural environment.

## TEACHING STRATEGIES

factor in generating and keeping interest to be enthusiastic!

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glass bottles

scrap metal

newspapers

the school grounds

vacant yards

public grounds and parks

water shorelines

stretch of roadway or hiking trails

through a periodic patrol

usually be returned for money.

enthusiastic!

the amounts of things collected and the benefits of such endeavors, they directly influence the students' interest.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-24

*Upon completion of this activity, each student should, as a minimum:*

*--be able to state one or more ways he can personally help to improve his environment.*

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

Day 1 Day 2 Day 3 Day 4 Day 5 Day 6

1.	Date taught (month and date, e.g. 11/2)						
2.	Minutes of class time on science each day						
3.	Minutes preparing for each day's science class						
4.	Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST  
MODERATE INTEREST OR INDIFFERENCE  
RESISTANCE OR DISLIKE


6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Were any monetary rewards or recognition gained by the collecting activity?

ERIC  
Full Text Provided by ERIC  
How much interest was generated in the cleanup project? How many continued on their own in the cleanup campaign?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
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Specific Questions:

12. Were any monetary rewards or recognition gained by the collecting activity?
13. How much interest was generated in the cleanup project? How many continued on their own in the cleanup campaign?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?



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C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

3. Recognize the need to recycle materials.

#### ENVIRONMENTAL THEME:

Cyclic Nature of Processes, Finiteness of Resources

#### INQUIRY SKILLS:

Associating, Applying

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task, Explaining, Defending, Answering Why Questions

#### PRACTICAL APPLICATION:

Working in Groups, Following Directions

## ACTIVITY

### Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

### C Objectives for the Student:

3. Recognize the need to recycle materials.

### TAL THEME:

c Nature of Processes, Finiteness of  
rces

### ILLS:

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### LVING SKILLS:

ng Question and Task, Explaining,  
ling, Answering Why Questions

### APPLICATION:

ng in Groups, Following Directions

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE C.

GARBAGE AND  
MY ENVIRONMENT

## ACTIVITY 4-25. THE RECYCLING PAYOFF



BSCS

Activity 4-25. The Recycling Payoff

*This activity emphasizes a rather difficult concept - recycling. To obtain a working definition of recycling and an appreciation of its good aspects are the main purposes of the activity. Other more subtle aspects of recycling may or may not be realized, depending on the readiness and background of your class. Increased understandings that could result from playing the game presented in this activity are as follows:*

- 1. An understanding and a working definition of recycling.*
- 2. A realization that some things are in finite supply and that the supply can be exhausted, perhaps because of circumstances we cannot control.*
- 3. An understanding of why recycling is frustrating: a) it may be the obvious thing to do, yet may not be possible at certain times and with certain things; b) it costs money and long-range benefits may not be obvious.*
- 4. A realization that there is an element of chance in finding new resource supplies and, therefore, man must continually search for new resource locations. The possible resource sites are also finite and, therefore, recycling will ultimately be essential.*
- 5. A realization that at times money, land, and other possessions are worthless if freedom is lost or if they cannot be used to secure desired ends.*

## TEACHING STRATEGIES

### -25. The Recycling Payoff

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e possessions are worthless if freedom  
ost or if they cannot be used to secure  
ed ends.

## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- participate in the Recycling Payoff Game
- develop an understanding of the rules of the game and use them in making wise choices in the game
- manage his "money" successfully and stay in the game as long as possible
- develop a working definition of recycling.

## MATERIALS

Recycling Payoff Game (one  
game set per four students)  
with two rigs per player  
Worksheet 4-8

## TEACHING STRATEGIES

### Teacher Preparation:

Prior to this activity select interested students to cut out and tape together the drilling rigs. Read the rules carefully prior to explaining them to the class so that you are familiar enough with the way the game is played to answer any questions that may arise.

The rules of the game are not as complex as they may first appear. To explain them to the class, it will be necessary to use a group of students as an example the first day it is played. Then the game should be played several times on Day 2 and Day 3. The game should also be played at times requested by the students and/or as seems appropriate to you.

Before the game is started, create interest by allowing students to drill just for fun on the game board. The game board has wooden blocks inside that should be placed in different locations each time the game is played. To accomplish this, the board should be shaken by the banker, placed in the middle of four players, and then not moved again until the game is over.

If students are worried by the concept of "drilling" for gold, etc., explain that these metals are mined, but in order to find out where to dig a mine, a drill may be used to find out what sort of rocks are under the ground.

### Rules of the Recycling Payoff Game:

1. The game can be played by two, three, or four players and a banker.
2. At the start of the game each player receives \$500.00 and two drilling rigs of the same color. A different color should be used for each player. (Once students are familiar with the rules, you may wish for variety to start with three rigs each, or to start with only \$300.00 and one plot of land.)

## TEACHING STRATEGIES

tion:

Activity select interested students to cut together the drilling rigs. Read the prior to explaining them to the class familiar enough with the way the game is any questions that may arise.

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When the game is started, create interest by allowing play just for fun on the game board. The wooden blocks inside that should be placed on the board each time the game is played. To play the board should be shaken by the teacher in the middle of four players, and then until the game is over.

Students worried by the concept of "drilling" for oil gain that these metals are mined, but in the area where to dig a mine, a drill may be used. What sort of rocks are under the ground.

### Cycling Payoff Game:

The game can be played by two, three, or four players and a banker.

At the start of the game each player receives two drilling rigs of the same color. The same color should be used for each player. If students are familiar with the rules, you may want to start with three rigs each, or start with only \$300.00 and one plot of land.)

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-25

## MATERIALS

## TEACHING STRATEGIES

3. Any method can be used to determine who goes first. After that, the player sequence is in a clockwise direction.
4. The banker handles all the money and makes sure players keep to the rules. (These can be written on the chalkboard if this will help.)
5. During the first round of play, each player will have to buy land; players cannot drill until they own land. Buying constitutes the first turn. A player must wait until at least his second turn to drill.
6. At any given turn after the first round, a player has three options - buy land, drill, or recycle - as outlined below.

### I. Buy Land

- A. Costs \$200.00 per plot.
- B. Pay banker \$200.00 and draw card from land card pile. The number on the card corresponds to the plot purchased by the player.
- C. Player keeps the land card in front of him until he drills that land, then turns the card over so it is no longer used.

### II. Drill

- A. A player can drill during his turn if he owns a piece of land to drill on and has an available drilling rig with which to drill. (When students are familiar with the game, they may wish to trade land cards before they drill.)



## TEACHING STRATEGIES

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drill.

ay given turn after the first round, a player  
three options - buy land, drill, or recycle -  
outlined below.

### Buy Land

1. Costs \$200.00 per plot.
2. Pay banker \$200.00 and draw card from  
land card pile. The number on the card  
corresponds to the plot purchased by  
the player.
3. Player keeps the land card in front of  
him until he drills that land, then turns  
the card over so it is no longer used.

### Drill

1. A player can drill during his turn if he  
owns a piece of land to drill on and has  
an available drilling rig with which to  
drill. (When students are familiar with  
the game, they may wish to trade land  
cards before they drill.)

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

Diagram 4-10



## TEACHING STRATEGIES

- B. Drill by placing the derrick over one of the sixty drilling holes on the game board and forcing the derrick stick into the hole. If the stick goes all the way down, a miss results; if it goes only partially down, a strike results.
- C. After drilling, follow one of two possible courses of action.
  1. If a strike occurs, (see Diagram 4-10), the player should DRAW A CARD from the strike pile, and collect the payoff, as described on the card, from the banker. His turn is then over and the rig is left on the property until a later turn.
  2. If the drilling was a miss (see Diagram 4-10) the player can either RECYCLE his rig or SELL his rig to the banker. If he recycles the rig:

The player pays \$100.00 to the banker, gets one piece of land, and a chance to drill again during this same turn. If a strike occurs on a recycling drill, the player can again collect by drawing a card from the strike card pile, but he may not drill again. After recycling once, the turn is over.

If the player elects to sell the drilling rig instead of recycle:

He turns in his rig to the banker and receives \$500.00. After selling, the turn is over.

## TEACHING STRATEGIES

fill by placing the derrick over one of the sixty drilling holes on the game board and forcing the derrick stick into the hole. If the stick goes all the way down, a miss results; if it goes only partially down, a strike results.

After drilling, follow one of two possible courses of action.

If a strike occurs, (see Diagram 4-10), the player should DRAW A CARD from the strike pile and collect the payoff, as described on the card, from the banker. His turn is then over and the rig is left on the property until a later turn.

If the drilling was a miss (see Diagram 4-10) the player can either RECYCLE his rig or SELL his rig to the banker. If he recycles the rig:

The player pays \$100.00 to the banker, gets one piece of land, and a chance to drill again during this same turn. If a strike occurs on a recycling drill, the player can again collect by drawing a card from the strike card pile, but he may not drill again. After recycling once, the turn is over.

If the player elects to sell the drilling rig instead of recycle:

He turns in his rig to the banker and receives \$500.00. After selling, the turn is over.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-25

Worksheet 4-8

RECYCLING PAYOFF GAME									
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

Diagram 4-11

RECYCLING PAYOFF GAME									
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60

Each group playing the game can use Worksheet 4-8 to keep track of strikes and misses. Place a circle on the land where a strike has been made and an X where there was a miss. (See Diagram 4-11.)

NOTE: There is no way to repurchase a rig in the game once it has been sold to the bank. This is the item in the game that is in finite supply. When you run out, either by choice or force, you can not buy a new one. Make this rule clear as early as possible.

### III. Recycling

A. A player may use his turn for recycling if he has a rig out in the field that is tied up from a previous strike or miss. On a recycling turn, the player must pay \$100.00 to recycle his rig. In addition he gets one piece of property that he can then drill on during that same turn. Once he has recycled during a turn, however, a player may not recycle again during the same turn! He must wait for another turn.

- Playing the game continues until one out of three or two out of four players are out of the game. You are out of the game when you have no drilling rigs to drill with. This will happen when the player has been forced to sell his rigs in order to get money to stay in the game.
- When two players are out of the game, the banker will pay the players still in the game \$1000.00 for each of their remaining rigs and \$100.00 for each piece of property not drilled on.
- The winner will then be determined according to who has the most money.

## TEACHING STRATEGIES

Each group playing the game can use Worksheet 4-8 to keep track of strikes and misses. Place a circle on the land where a strike has been made and an X where there was a miss. (See Diagram 4-11.)

There is no way to repurchase a rig in the game if it has been sold to the bank. This is the rule in the game that is in finite supply. When rigs run out, either by choice or force, you can buy a new one. Make this rule clear as early as possible.

### Recycling

A player may use his turn for recycling if he has a rig out in the field that is tied up from a previous strike or miss. On a recycling turn, the player must pay \$100.00 to recycle his rig. In addition he gets one piece of property that he can then drill on during that same turn. Once he has recycled during a turn, however, a player may not recycle again during the same turn! He must wait for another turn.

The game continues until one out of three or two out of four players are out of the game. The game ends when you have no drilling rigs to drill with. This will happen when the player has been forced to sell his rigs in order to have money to stay in the game.

When two players are out of the game, the banker pays the players still in the game \$1000.00 each of their remaining rigs and \$100.00 for each piece of property not drilled on.

The winner will then be determined according to who has the most money.

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

By design, the person who has recycled rigs most often will be the winner. This may not be obvious to students at first, and it may take several playings to bring this out. They will soon catch on to what it takes to stay in the game (i.e., recycle every time you can), and this should be the time that you point out to the students the advantages of recycling materials. Stress the concept of recycling whenever possible while the students are playing the game. Bring in other examples of recycling whenever possible.

After playing the game several times, ask these questions:

WHAT IS THE BEST WAY TO PLAY IN ORDER TO WIN THIS GAME?

WHAT DOES RECYCLE MEAN IN THIS GAME?

WHAT IS RECYCLED IN OUR GAME?

WHY MIGHT PEOPLE RECYCLE OIL RIGS?

COULD WE RUN OUT OF METAL TO MAKE OIL RIGS?

DO WE HAVE ENDLESS AMOUNTS OF THE THINGS WE ARE DRILLING FOR IN OUR GAME?

WHAT WILL HAPPEN TO THE LAND IF WE GO ON PLAYING THE GAME FOR A LONG TIME?

WILL WE BE ABLE TO FIND THINGS BY DRILLING THEN?

## TEACHING STRATEGIES

person who has recycled rigs most often  
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soon catch on to what it takes to stay  
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PEOPLE RECYCLE OIL RIGS?

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ENDLESS AMOUNTS OF THE THINGS WE  
NG FOR IN OUR GAME?

HAPPEN TO THE LAND IF WE GO ON  
E GAME FOR A LONG TIME?

ABLE TO FIND THINGS BY DRILLING

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-25

Students should:

--conclude that it is to a player's advantage to  
recycle, and say, "Recycle a lot," "Don't  
sell your drillers," "Cheat."

--respond, "Reuse something," "To use something  
over."

--respond, "The oil rig."

--respond, "Save money," "Use the scrap metal,"  
"Run out of metal otherwise."

--respond, "Yes," "Don't know."

--respond, "No."

--infer, "It will run out."

--respond, "No."

**MATERIALS**

**TEACHING STRATEGIES**

IF WE COULDN'T GET ANY MORE GOLD, WHAT COULD WE DO TO STOP RUNNING OUT OF GOLD?

WHAT ARE SOME THINGS PEOPLE TRY TO RECYCLE?

DO YOU RECYCLE ANYTHING?

List on the chalkboard as many recyclable items or materials as the students can name.

WHY DO WE TRY TO RECYCLE THESE THINGS?

HOW DO PEOPLE BENEFIT FROM RECYCLING THINGS?

DOES RECYCLING COST MONEY LIKE IT DID IN THE GAME?

THEN WHY DO WE DO IT?

Then conclude with this statement:

AS A MATTER OF FACT, THERE ARE MANY THINGS IN OUR ENVIRONMENT THAT ARE IN DANGER OF BEING USED UP BECAUSE THERE IS ONLY A CERTAIN AMOUNT OF THEM. ONCE THAT AMOUNT IS USED THERE WILL BE NO MORE. FOR THOSE MATERIALS, WHAT MUST BE DONE?

THERE ARE THREE REASONS FOR RECYCLING. WHAT ARE THEY?



## TEACHING STRATEGIES

WE COULDN'T GET ANY MORE GOLD, WHAT COULD WE  
DO STOP RUNNING OUT OF GOLD?

ARE SOME THINGS PEOPLE TRY TO RECYCLE?

DO YOU RECYCLE ANYTHING?

Write on the chalkboard as many recyclable items or  
things as the students can name.

DO WE TRY TO RECYCLE THESE THINGS?

DO PEOPLE BENEFIT FROM RECYCLING THINGS?

DOES RECYCLING COST MONEY LIKE IT DID IN THE  
PAST?

WHY DO WE DO IT?

Include with this statement:

AS A MATTER OF FACT, THERE ARE MANY THINGS IN  
OUR ENVIRONMENT THAT ARE IN DANGER OF BEING  
WASTED UP BECAUSE THERE IS ONLY A CERTAIN AMOUNT  
OF THEM. ONCE THAT AMOUNT IS USED THERE WILL BE  
NONE LEFT. FOR THOSE MATERIALS, WHAT MUST BE  
DONE?

ARE THERE THREE REASONS FOR RECYCLING. WHAT  
ARE THEY?

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--infer, "Recycle."

--name a variety of items such as bottles,  
cans, clothes, cars, oil, paper, glass, metal,  
water, aluminum, etc.

--reply, "No," "Yes, I pick up beer cans," "Take  
pop bottles back to the store."

--respond, "Because we will run out," "For money,"  
"Get your money back on pop bottles."

--respond, "Have materials to use over again,"  
"Saves money," "Things last longer."

--respond, "Yes," "No," "May make money."

--infer, "Might be necessary," "No other place to  
get materials," "Cheaper than buying new  
stuff."

--indicate that such finite materials must be  
recycled if the use of them is to continue.

--indicate an understanding of the rationale for  
recycling by making statements that mean:

## MATERIALS

## TEACHING STRATEGIES

Write the three reasons on the chalkboard, using the students' terminology.

Set aside one game for students to take home to play with their friends and families. Allow the students to check the game out for one or more days.

This activity has given students some opportunity to deal with the concept of recycling. However, the Recycling Payoff Game has approached the concept somewhat abstractly in dealing with oil rigs, buying land, and strikes and misses. The students, therefore, may have greatly enjoyed the game without relating the concept of recycling to themselves. While the concept of recycling may be of the utmost importance, the value of the game should not be minimized as an enjoyable experience.

In order to assess the students' ability to transfer the concept of recycling to a more personal concrete level, ask each student to take out a piece of paper and a pencil. Then say:

YOU AND YOUR FAMILY HAVE MANY THINGS IN YOUR HOMES. I WOULD LIKE YOU TO WRITE DOWN AS MANY THINGS AS YOU CAN THINK OF. I WILL HELP YOU SPELL THE WORDS.

During the time the students are writing, circulate around the room and give the students help in spelling

## TEACHING STRATEGIES

reasons on the chalkboard, using the analogy.

Let students take home to play with families. Allow the students to check one or more days.

Give students some opportunity to accept of recycling. However, the Game has approached the concept somewhat dealing with oil rigs, buying land, crises. The students, therefore, may play the game without relating the thing to themselves. While the concept is of the utmost importance, the game should not be minimized as an enjoyable

Test the students' ability to transfer the concept to a more personal concrete level, by taking out a piece of paper and a pen:

"FAMILY HAVE MANY THINGS IN YOUR HOME. WOULD YOU LIKE ME TO WRITE DOWN AS MANY THINGS AS YOU CAN THINK OF. I WILL HELP YOU WITH THE WORDS."

While the students are writing, circulate and give the students help in spelling

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-25

Students should:

- some materials are in finite supply, "So we won't run out of stuff."
- it is wise long-term economics to recycle, "Cheaper to buy used stuff," "Can make money."
- it helps alleviate the solid waste disposal problem, "Won't be so much junk around."

**MATERIALS**

**TEACHING STRATEGIES**

the things they think of. Because this is an attempt to learn how your students think, please do not suggest things they may have in their homes. If some students have trouble getting started and ask for help, give a slight hint, such as, "What kinds of things do you have in your bedroom?" but do not give the name of an item.

When all students have had sufficient time to make a list, say:

NOW DRAW A CIRCLE AROUND ALL OF THE THINGS ON YOUR LIST THAT HAVE BEEN RECYCLED.

When all students have finished say:

NOW THINK IF THE OTHER THINGS ON YOUR LIST COULD HAVE BEEN RECYCLED. MARK AN X BY THOSE THAT COULD HAVE BEEN.

When all students have finished, collect the papers. Then discuss the activity with the students and hear their justifications for their answers. Please send the papers to BSCS with any comments you may have about them.

## TEACHING STRATEGIES

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ifications for their answers. Please send  
to BSCS with any comments you may have about

## ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student  
should, as a minimum:*

- be able to play the Recycling Payoff Game*
- have stated at least one benefit of recycling*
- be able to suggest at least one recyclable material.*

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes      Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?
7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:
8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile      ☐ Of value--needs the      ☐ Worth salvaging--make      ☐ Worthless  
    --keep as is      revision suggested      major changes described      --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

## Specific Questions:

12. Did any students not enjoy the recycling game? ☐ No ☐ Yes      Discuss:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

**Specific Questions:**

12. Did any students not enjoy the recycling game? ☐ No ☐ Yes Discuss:
13. How difficult are the rules for the students?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

BSCS Evaluation: EN



B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

3. Recognize the need to recycle materials.
4. Identify ways to recycle materials.

#### ENVIRONMENTAL THEME:

Cyclic Nature of Processes, Finiteness of Resources

#### INQUIRY SKILLS:

Applying

#### PROBLEM-SOLVING SKILLS:

Knowing Question and Task

#### PRACTICAL APPLICATION:

Stimulate Artistic or Hobby Interests

## ACTIVITY

Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
1. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
1. Comprehend the role of man as an integral part of nature not apart from nature.

Objectives for the Student:

1. Recognize the need to recycle materials.
1. Identify ways to recycle materials.

AL THEME:

Nature of Processes, Finiteness of  
ces

LLS:

ng

VING SKILLS:

g Question and Task

PPLICATION:

ate Artistic or Hobby Interests

UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

CORE C.

GARBAGE AND  
MY ENVIRONMENT

ACTIVITY 4-26. ME, RECYCLING,  
AND ART



BSCS

**MATERIALS**

- \*Recycled materials
- \*Art supplies

\*Not furnished in materials kit

**TEACHING STRATEGIES**

Activity 4-26. Me, Recycling, and Art

*This last of three recycling activities should allow students the opportunity to create something useful or artistic from recycled materials. It is a practical and concrete way to complete the unit.*

Teacher Preparation:

The success of this activity will depend on the number of materials collected by the students, the tools provided by you, and the enthusiasm created by all. Encourage as much creativity and enthusiasm in your students as you can.

Direct your students' attention to the collected materials and tell them that they will now create something from the recycled materials they've been collecting for the past days and weeks. Place few, if any, limits on their creativity other than that the materials used (except for glue, nails, tools, etc.) must be truly waste, things that would normally be thrown away. You will provide as many of the tools and working materials as possible, but encourage students to bring in their own tools to work with also. Contact the art, industrial arts, and home economics instructors for ideas and assistance if necessary.

Allow the students as much freedom as possible, and provide assistance only when necessary or requested. Remember the success your students had in constructing spaceships from Styrofoam cups in Unit I.

Be enthusiastic! Discuss with your class a few of the projects listed below. Solicit student ideas and give praise for all creative suggestions.

## TEACHING STRATEGIES

### 26. Me, Recycling, and Art

*Three recycling activities should allow the opportunity to create something useful from recycled materials. It is a practical way to complete the unit.*

#### Preparation:

of this activity will depend on the number of collected by the students, the tools provided by the enthusiasm created by all. Encourage as much enthusiasm in your students as you can.

students' attention to the collected materials. Remind them that they will now create something from the materials they've been collecting for the past weeks. Place few, if any, limits on their choices other than that the materials used (except nails, tools, etc.) must be truly waste, which would normally be thrown away. You will use many of the tools and working materials as you encourage students to bring in their own work with also. Contact the art, industrial, or home economics instructors for ideas and help if necessary.

students as much freedom as possible, and assistance only when necessary or requested. Review the success your students had in constructing projects from Styrofoam cups in Unit I.

Activity! Discuss with your class a few of the activities listed below. Solicit student ideas and give credit for all creative suggestions.

## ANTICIPATED STUDENT BEHAVIORS

*During this activity, each student should:*

- select recycled materials of his choice for incorporation into an artistic or useful object*
- complete the construction of his recycled art or utilitarian form*
- recognize that some waste materials may be reused and serve a useful purpose.*

## MATERIALS

## TEACHING STRATEGIES

Following are some suggested projects:

1. Christmas tree decorations made from old flash cubes, light bulbs, Popsicle sticks, tin can covers, gum wrappers or newspaper chains.
2. Ash trays or coasters from tin cans.
3. Waste baskets from circular cardboard or metal drums.
4. Terrariums from old bottles.
5. Swings from old tires.
6. Pencil holders from old tin cans.
7. Window decorations or grouted hot pads from tumbled bits of colored glass.
8. Doll furniture from lumber scraps.
9. Three-dimensional collages.
10. Abstract sculptures.
11. Needlework projects with scraps of material.
12. Glasses from bottles cut with a bottle cutter and sanded.
13. Mobiles from scraps of metal.

## TEACHING STRATEGIES

me suggested projects:

tree decorations made from old flash  
ht bulbs, Popsicle sticks, tin can  
m wrappers or newspaper chains.

or coasters from tin cans.

ets from circular cardboard or metal

from old bottles.

m old tires.

ders from old tin cans.

orations or grouted hot pads from  
ts of colored glass.

ture from lumber scraps.

nsional collages.

culptures.

projects with scraps of material.

om bottles cut with a bottle cutter

om scraps of metal.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-26

*Upon completion of this activity, each student  
should, as a minimum:*

*--have completed a recycled art or utilitarian  
object.*

ACTIVITY  
4-26

## MATERIALS

## TEACHING STRATEGIES

CHANGE

See Change of Pacers 30 and 31.



## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS



CHANGE OF PACER

of Pacers 30 and 31.

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST

MODERATE INTEREST OR INDIFFERENCE

RESISTANCE OR DISLIKE


6. Equipment problems? In kit?
- ☐
- No
- ☐
- Yes - Obtained by you?
- ☐
- No
- ☐
- Yes
- 
- If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?

☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow?
- ☐
- Yes
- ☐
- No -- Pages and Problem:

10. Did you omit any part(s) of this activity?
- ☐
- Yes
- ☐
- No -- Identify which part(s) were omitted and
- WHY
- :

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
                   --keep as is           revision suggested           major changes described           --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. How did you obtain the "recycled materials"?

What items were most in demand?

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. How did you obtain the "recycled materials"?
13. What items were most in demand?
14. Were you and the students pleased with what was made?
15. What was made? Would you send photographs to us?

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

Concern (or questions) about content:

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

1. Perceive that garbage (solid waste) presents a difficult man-made problem.
2. Recognize the composition of daily garbage.
3. Recognize the need to recycle materials.
4. Identify ways to recycle materials.
5. Realize the positive role microbes play in the decomposition process.

#### ENVIRONMENTAL THEME:

Cyclic Nature of Processes, Finiteness of Resources

#### INQUIRY SKILLS:

Associating, Applying

## ACTIVITY

### Goals for the Student:

2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

### C Objectives for the Student:

1. Perceive that garbage (solid waste) presents a difficult man-made problem.
2. Recognize the composition of daily garbage.
3. Recognize the need to recycle materials.
4. Identify ways to recycle materials.
5. Realize the positive role microbes play in the decomposition process.

### AL THEME:

Nature of Processes, Finiteness of  
ces

### LLS:

ating, Applying

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE C.

GARBAGE AND  
MY ENVIRONMENT

## ACTIVITY 4-27. CLUES TO SUCCESS



BSCS



## Me and my Environment

### PROBLEM-SOLVING SKILLS:

Discussion, Explaining

### PRACTICAL APPLICATION:

Practicing Writing Skills:

#### Activity 4-27. Clues to Success

*In this activity the students are given the opportunity to express their attitudes about recycling and garbage. Two worksheets and four slides serve as a stimulus for discussion.*



DISTRIBUTE MATERIALS

#### Part I.

In previous activities students have been given the opportunity to practice following one direction at a time. In this activity students will be asked to follow a series of three directions given at the same time. This task requires students to keep several things in their memories and is more difficult than following single directions.

Before beginning the activity, turn to the Progress in Following Directions page of the Student Record of Progress. Using the guidelines, rate students on their ability to follow directions that involve a series of steps.

- Worksheet 4-9
- Worksheet 4-10
- Slides 4-35 through 4-38
- \*35 mm Slide projector
- \*Tape recorder
- \*Blank cassette(s)

\*Not furnished in materials kit



LIVING SKILLS:  
Discussion, Explaining

APPLICATION:  
Practicing Writing Skills:

### Clues to Success

By the students are given the opportunity  
to express attitudes about recycling and garbage.  
and four slides serve as a stimulus for

*During this activity, each student should:*

- express his attitudes toward garbage and recycling by completing Worksheets 4-9 and 4-10
- defend his answers to the questions on Worksheets 4-9 and 4-10.

  
DISTRIBUTE MATERIALS

Activities students have been given the  
opportunity to practice following one direction at a  
time. In this activity students will be asked to follow  
three directions given at the same time.  
This requires students to keep several things in  
mind and is more difficult than following  
one direction at a time.

By the activity, turn to the Progress in  
Achievement page of the Student Record of  
Achievement. By the guidelines, rate students on their  
ability to follow directions that involve a series of



BSCS

Worksheet 4-9



Slide 4-35, Worksheet 4-9A



Distribute Worksheet 4-9.

Then say:

FIRST, FIND SIDE A OF YOUR WORKSHEET. TODAY YOU ARE GOING TO HAVE ANOTHER CHANCE TO PRACTICE FOLLOWING DIRECTIONS.

Then say:

THIS TIME I WILL TELL YOU TO DO THREE THINGS. YOU WILL NEED TO LISTEN CAREFULLY BECAUSE I WILL TELL YOU ALL THREE THINGS BEFORE YOU BEGIN. I WILL SAY THE DIRECTIONS TWICE AND WILL NOT REPEAT THEM AGAIN.

LISTEN CAREFULLY, HERE ARE THE DIRECTIONS:

WRITE YOUR NAME IN THE UPPER LEFT-HAND CORNER OF YOUR PAPER.

PRINT THE DATE IN THE UPPER RIGHT-HAND CORNER OF YOUR PAPER.

DRAW A CIRCLE AROUND YOUR FIRST NAME.

When all students have followed the directions, say:

NOW I WOULD LIKE YOU TO ANSWER SOME QUESTIONS ABOUT RECYCLING AND GARBAGE.

Project each question, Slides 4-35 through 4-38, separately. Read Question 1 and the answer choices aloud to the students. Allow ample time for them to mark their worksheets. Repeat this procedure for the next three questions.

## TEACHING STRATEGIES

Worksheet 4-9.

FIND SIDE A OF YOUR WORKSHEET. TODAY  
E GOING TO HAVE ANOTHER CHANCE TO PRACTICE  
ING DIRECTIONS.

ME I WILL TELL YOU TO DO THREE THINGS.  
LL NEED TO LISTEN CAREFULLY BECAUSE I  
LL YOU ALL THREE THINGS BEFORE YOU BEGIN.  
SAY THE DIRECTIONS TWICE AND WILL NOT  
THEM AGAIN.

CAREFULLY, HERE ARE THE DIRECTIONS:

OUR NAME IN THE UPPER LEFT-HAND CORNER  
PAPER.

HE DATE IN THE UPPER RIGHT-HAND CORNER  
PAPER.

CIRCLE AROUND YOUR FIRST NAME.

dents have followed the directions, say:

OULD LIKE YOU TO ANSWER SOME QUESTIONS  
ECYCLING AND GARBAGE.

question, slides 4-35 through 4-38,  
Read Question 1 and the answer choices  
students. Allow ample time for them to  
orksheets. Repeat this procedure for the  
uestions.

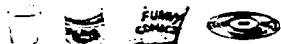
## ANTICIPATED STUDENT BEHAVIORS

Students should:

--recognize the comic book in Question 1, as the  
only biodegradable material and mark Picture C  
with an X.

## MATERIALS

Slide 4-36, Worksheet 4-9A



Slide 4-37, Worksheet 4-9B

Slide 4-38, Worksheet 4-9B



## TEACHING STRATEGIES

When reading Question 2, be sure to emphasize that more than one answer can be marked.

After all students have had the opportunity to answer all of the questions, collect the worksheets. Then project each slide and discuss the answers with them. Have them defend their choices. Since Questions 2, 3, and 4 assess attitude as well as concept, the student should be given due credit for defending his answer in a logical manner. Allow them to challenge one another. The discussion will give you insight about which points still need to be stressed.

INVOLVE YOUR  
SLOWEST  
STUDENTS

After class tally the students' answers on Tallysheet 4-6. Consider whether the whole class needs further review or if a few individuals need special attention.

### Part II.

Distribute Worksheet 4-10 and have each student write his name and the date on it. Read the question and explain what is to be done. Let the students interpret the four pictures themselves, however.

## TEACHING STRATEGIES

tion 2, be sure to emphasize that more  
can be marked.

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collect the worksheets. Then project  
discuss the answers with them. Have them  
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ed.

the students' answers on Tallysheet  
ether the whole class needs further  
y individuals need special attention.

et 4-10 and have each student write  
ate on it. Read the question and  
be done. Let the students interpret  
themselves, however.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-27

Students should:

- recognize that all the choices in Question 2 contribute to the garbage problem, and so mark.
- in Question 3 mark Choice B as the word that best describes garbage microbes.
- choose B in Question 4 as the best thing for our environment.

INVOLVE YOUR  
SLOWEST  
STUDENTS

Worksheet 4-10



Give the students a choice of how they wish to complete the story on their own. Have paper available and a tape recorder for those students who wish to use it.

Fill in Tallysheet 4-7 applying to Worksheet 4-10. Send both tallysheets to BSCS.

Send all responses to Worksheet 4-10 to BSCS.

Interpreting and Scoring Worksheet 4-9. All of the items on this worksheet are summarized on Tallysheet 4-6 which should be used to record results on the Concepts page of the Student Record of Progress. Item 1 assesses the concept that only organic matter is decomposed. Students use the inquiry skills of associating and applying to answer the question. Review the compost activities for those students who marked a wrong answer.

Turn to the Concepts page of the Student Record of Progress. Find the column marked "Activity 4-27, Biodegradable." Circle YES if the student marked choice C, the comic book. Otherwise, circle NO.

Item 2 assesses the concept that garbage is a problem. Four or more choices should be marked. Those students marking less than four need help in understanding this concept. Review Activity 4-20 for these students.

Find the column marked "Activity 4-27, Garbage Problem." Circle HIGH if the student marked more than four choices. Circle LOW if the student marked less than three choices. Circle SOME for all other students.

## TEACHING STRATEGIES

Students a choice of how they wish to complete on their own. Have paper available and a tape for those students who wish to use it.

Tallysheet 4-7 applying to Worksheet 4-10. Tallysheets to BSCS.

Responses to Worksheet 4-10 to BSCS.

ing and Scoring Worksheet 4-9. All of the this worksheet are summarized on Tallysheet should be used to record results on the page of the Student Record of Progress.

esses the concept that only organic matter is Students use the inquiry skills of and applying to answer the question. Review activities for those students who marked answer.

Concepts page of the Student Record of Find the column marked "Activity 4-27, le." Circle YES if the student marked the comic book. Otherwise, circle NO.

esses the concept that garbage is a problem. re choices should be marked. Those students s than four need help in understanding this review Activity 4-20 for these students.

lumn marked "Activity 4-27, Garbage Problem." if the student marked more than four choices. if the student marked less than three choices. for all other students.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--complete the story with any number of intermediate steps, but at least one step should indicate a recycling use such as: returning it to a recycling center, using it to make papier-mache, shredding it for packing materials, and so forth.

## MATERIALS

## TEACHING STRATEGIES

Item 3 assesses students' understanding that microbes are living things and can be helpful to man. Previous activities in Unit II and IV have stressed this concept. It is important that students understand this concept. Necessary review is mandatory for any who marked this question incorrectly.

Find the column marked "Activity 4-27, Microbes." Circle YES if the student marked choice B, Helpful. Otherwise, circle NO.

Item 4 -- The concept that recycling is best for the environment is assessed in this question. Some may mark A, but the correct answer is B. Be sure your review of the worksheet includes a discussion of this question. This will give insight into which points still need to be stressed.

Find the column marked "Activity 4-27, Recycling." Circle YES if the student marked choice B, recycling the soda bottles. Otherwise, circle NO.

Turn to the Progress in Following Directions page of the Student Record of Progress. Circle YES if students were able to carry out all parts of the direction. Circle NO if students were not able to carry out any part of the direction. Circle PART for all other students.

Information for scoring Worksheet 4-10 appears on Tallysheet 4-7.



## TEACHING STRATEGIES

students' understanding that microbes  
and can be helpful to man. Previous  
t II and IV have stressed this concept.  
that students understand this concept.  
is mandatory for any who marked this  
tly.

marked "Activity 4-27, Microbes." Circle  
at marked choice B, Helpful. Otherwise,

cept that recycling is best for the  
essed in this question. Some may mark  
t answer is B. Be sure your review of  
cludes a discussion of this question.  
sight into which points still need to

marked "Activity 4-27, Recycling." Circle  
at marked choice B, recycling the soda  
se, circle NO.

ess in Following Directions page of  
ed of Progress. Circle YES if students  
y out all parts of the direction. Circle  
re not able to carry out any part of  
ircle PART for all other students.

scoring Worksheet 4-10 appears on

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-27

*Upon completion of this activity, each student  
should, as a minimum:*

- have completed Worksheet 4-9*
- have indicated an ending to the picture story in  
Worksheet 4-10.*

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

NONE UP TO: 1/4 1/2 3/4 ALL

HIGH INTEREST  
MODERATE INTEREST OR INDIFFERENCE  
RESISTANCE OR DISLIKE


6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Were any items on Worksheet 4-9 unsatisfactory? ☐ No ☐ Yes Which ones? \_\_\_\_\_  
Explain:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
 --keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

**Specific Questions:**

12. Were any items on Worksheet 4-9 unsatisfactory? ☐ No ☐ Yes Which ones? \_\_\_\_\_  
 Explain:
13. Would you suggest other assessments of the understandings in Unit IV?
14. Please send in Tallysheets 4-6 and 4-7 and Worksheet 4-9.

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

- B. What anecdotes of student learning did you see or hear in your classroom?
- C. Concern (or questions) about content:
- D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?



## Me and my Environment

### FOCUS FOR THIS ACTIVITY

#### CONTENT:

##### Unit Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

##### Core C Objectives for the Student:

None indicated

#### ENVIRONMENTAL THEME:

Interrelationships of Environmental Components,  
Flow of Energy, Cyclic Nature of Processes

#### INQUIRY SKILLS:

Applying

#### PROBLEM-SOLVING SKILLS:

Interpreting Results

#### PRACTICAL APPLICATION:

Using What Has Been Learned

## ACTIVITY

### Goals for the Student:

1. Develop an understanding of the flow of energy through the living world.
2. Develop an understanding of cycling and appreciate the cycling relationship of the materials and organisms in the environment.
3. Recognize the role of decomposers in the cycling process.
4. Realize that because certain materials are in finite supply, the extent to which man uses these materials will have an impact on the environment.
5. Comprehend the role of man as an integral part of nature not apart from nature.

Objectives for the Student:  
None indicated

### AL THEME:

relationships of Environmental Components,  
of Energy, Cyclic Nature of Processes

### ILLS:

ng

### IVING SKILLS:

reting Results

### PPPLICATION:

What Has Been Learned

## UNIT IV.

TRANSFER AND CYCLING  
OF MATERIALS IN  
MY ENVIRONMENT

## CORE C.

GARBAGE IN  
MY ENVIRONMENT

## ACTIVITY 4-28. WHAT DO YOU THINK?



BSCS

ACTIVITY  
4-28

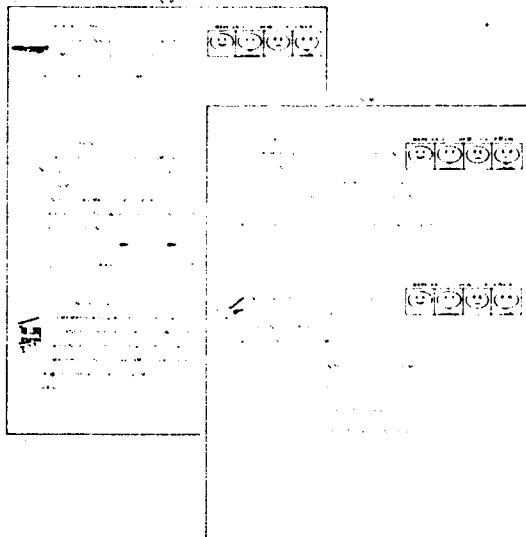
MATERIALS

Worksheets 4-11 through 4-14

Slide 4-39

\*35 mm Slide projector

Worksheet 4-11



\*Not furnished in materials kit

TEACHING STRATEGIES

Activity 4-28. What Do You Think?

*This activity reviews the variety of things students have done in Unit IV. It provides an indication of the students' interest in science and identifies those activities that were most popular. Some major skills and concepts are assessed to provide an indication of the students' understanding of this unit. Following this activity is a repeat of favorite activities; a review of difficult concepts closes the unit. Student responses are scored and recorded, the Student Record of Progress is reviewed, and a summary of each student's progress in Unit IV is prepared.*

Part I. First Day

Distribute Worksheet 4-11 and say:

WE HAVE DONE LOTS OF THINGS IN SCIENCE THIS YEAR.  
LET'S LOOK BACK AT SOME OF THE THINGS WE HAVE  
DONE. AS I READ THE DESCRIPTION OF AN ACTIVITY  
WE DID, MARK WHETHER YOU LIKED IT, WERE NOT  
INTERESTED, DISLIKED IT, OR DON'T REMEMBER IT.  
FOR SOME ACTIVITIES, YOU WILL HAVE A CHANCE TO  
SHOW WHAT YOU LEARNED. AFTER WE FINISH THE  
WORKSHEET, YOU WILL HAVE A CHANCE TO TALK ABOUT  
THE ACTIVITIES, AND WE CAN DO SOME OF THEM  
AGAIN IF YOU LIKE.

The activities listed on Worksheet 4-11, 4-12, 4-13, and 4-14 do not correspond to the numbering of activities in the Teacher's Guide. Some activities have been combined. Clues to Success are not listed. The following list keys the worksheet activities to the Guide. Read the brief description of each activity that is on the worksheet to remind students of the activity. Be sure to add comments calling upon personal experiences in your class. If you wish to dramatize the activities, you could set up and display some equipment used in the activity.



## TEACHING STRATEGIES

### 28. What Do You Think?

by reviews the variety of things students have in Unit IV. It provides an indication of the interest in science and identifies those that were most popular. Some major skills are assessed to provide an indication of the understanding of this unit. Following this is a repeat of favorite activities; a review of concepts closes the unit. Student work is scored and recorded, the Student Record of Unit IV is reviewed, and a summary of each student's Unit IV is prepared.

### 1st Day

Worksheet 4-11 and say:

DONE LOTS OF THINGS IN SCIENCE THIS YEAR.  
LOOK BACK AT SOME OF THE THINGS WE HAVE  
AS I READ THE DESCRIPTION OF AN ACTIVITY  
MARK WHETHER YOU LIKED IT, WERE NOT  
INTERESTED, DISLIKED IT, OR DON'T REMEMBER IT.  
IN THE ACTIVITIES, YOU WILL HAVE A CHANCE TO  
TALK ABOUT WHAT YOU LEARNED. AFTER WE FINISH THE  
UNIT, YOU WILL HAVE A CHANCE TO TALK ABOUT  
THE ACTIVITIES, AND WE CAN DO SOME OF THEM  
IF YOU LIKE.

Activities listed on Worksheet 4-11, 4-12, 4-13, and  
correspond to the numbering of activities  
in the Teacher's Guide. Some activities have been  
omitted. Successes are not listed. The  
chart keys the worksheet activities to the  
brief description of each activity  
on the worksheet to remind students of the  
activities. Be sure to add comments calling upon personal  
experiences in your class. If you wish to dramatize  
activities, you could set up and display some  
models used in the activity.

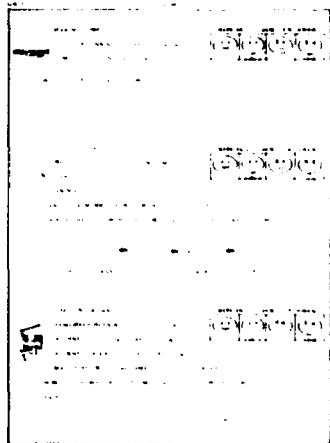
## ANTICIPATED STUDENT BEHAVIORS

During this activity, each student should:

- recall each described activity in Unit IV and rate his opinion of it
- answer each of the questions on Worksheets 4-11, 4-12, 4-13, and 4-14
- review the questions
- repeat selected activities.

## MATERIALS

Slide 4-39, Worksheet 4-11A



## TEACHING STRATEGIES

Now project Slide 4-39 of Worksheet 4-11A and explain what they will be doing and how they should mark their opinions and answer the questions.

Have the students begin the worksheet by finding the side that starts with "1. Making Compost." Have them put the date and their names on the worksheet.

Turn off the projector.

Then say:

HOW MANY OF YOU REMEMBER MAKING THE COMPOST  
FILES?

Direct the students' attention to the worksheet and read through each question twice, giving them time to fill in their answers.

### 1. (Activity 4-0) Making Compost.

AT THE BEGINNING OF THE UNIT WE MADE  
COMPOST FILES IN PLASTIC BOXES.

WHAT WAS YOUR OPINION OF THAT ACTIVITY? MARK  
AN X IN THE SPACE ON THE RIGHT SIDE OF YOUR  
PAPER TO SHOW IF YOU LIKED IT, IF YOU WERE  
NOT INTERESTED, IF YOU DISLIKED IT, OR IF  
YOU DON'T REMEMBER THAT ACTIVITY. IF YOU WERE  
ABSENT, YOU MIGHT HAVE MISSED SOME OF THESE  
ACTIVITIES.

NOW LET'S TEST YOUR MEMORY. WHAT DID WE PUT  
IN OUR COMPOST FILES? WRITE DOWN ALL THE  
THINGS YOU CAN REMEMBER ON THE LINES BELOW  
QUESTION 1.

## TEACHING STRATEGIES

4-39 of Worksheet 4-11A and explain doing and how they should mark their er the questions.

begin the worksheet by finding the with "1. Making Compost." Have them their names on the worksheet.

ector.

YOU REMEMBER MAKING THE COMPOST

ts' attention to the worksheet and read tion twice, giving them time to fill

-0) Making Compost.

ING OF THE UNIT WE MADE  
S IN PLASTIC BOXES.

R OPINION OF THAT ACTIVITY? MARK  
SPACE ON THE RIGHT SIDE OF YOUR  
IF YOU LIKED IT, IF YOU WERE  
ED, IF YOU DISLIKED IT, OR IF  
EMBER THAT ACTIVITY. IF YOU WERE  
MIGHT HAVE MISSED SOME OF THESE

ST YOUR MEMORY. WHAT DID WE PUT  
ST PILES? WRITE DOWN ALL THE  
AN REMEMBER ON THE LINES BELOW

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-28

Students should:

--write their names and the date on Worksheet  
4-11.

--respond by raising hands.

--mark X's in the columns to indicate their  
opinions.

--write down things that were put into the  
compost piles.

**MATERIALS**

**TEACHING STRATEGIES**

**GIVE  
TIME  
TO  
THINK**

If necessary, direct students not to share their answers until the worksheets have been completed. Assist students with spelling as necessary.

2. (Activities 4-1 and 4-2) Food Chains.

WE PLAYED THE FOOD CHAIN GAME WITH CARDS THAT HAD PICTURES OF PLANTS AND ANIMALS.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

CAN YOU REMEMBER HOW TO MAKE A FOOD CHAIN? CHOOSE THE RIGHT WORDS UNDER QUESTION 2 TO WRITE IN THE BLANKS TO COMPLETE THIS FOOD CHAIN: SOMETHING, FROG, INSECT, SOMETHING. THE WORDS ARE: DEER, MAN, GRASS, SNAKE, COW.

3. (Activity 4-3) The Long Journey.

REMEMBER WHEN WE READ *THE LONG JOURNEY* TOGETHER? WE FOLLOWED THE JOURNEY OF A PIECE OF BODY-BUILDING MATERIAL UNTIL IT BECAME A PART OF YOUR HAIR. MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

**GIVE STUDENTS  
TIME  
TO  
THINK**



Students should:

y, direct students not to share their  
all the worksheets have been completed.  
ents with spelling as necessary.

vities 4-1 and 4-2) Food Chains.

YED THE FOOD CHAIN GAME WITH CARDS THAT  
CTURES OF PLANTS AND ANIMALS.

N X TO SHOW YOUR OPINION OF THIS  
TY.

U REMEMBER HOW TO MAKE A FOOD CHAIN?  
THE RIGHT WORDS UNDER QUESTION 2 TO  
IN THE BLANKS TO COMPLETE THIS FOOD  
SOMETHING, FROG, INSECT, SOMETHING.  
RDS ARE: DEER, MAN, GRASS, SNAKE, COW.

--mark X's in the columns to indicate their  
opinions.

--fill in the blanks with "Snake," and "Grass."

**WORK  
TIME**



ity 4-3) The Long Journey.

ER WHEN WE READ *THE LONG JOURNEY* TOGETHER?  
OWED THE JOURNEY OF A PIECE OF BODY-  
G MATERIAL UNTIL IT BECAME A PART OF  
IR. MARK AN X TO SHOW YOUR OPINION OF  
TIVITY.

--mark X's in the columns to indicate their  
opinions.

## MATERIALS

## TEACHING STRATEGIES

HOW DID THE BODY-BUILDING MATERIAL GET FROM THE COW'S LEG TO YOUR HAIR?

WRITE YOUR ANSWER ON THE LINES UNDERNEATH QUESTION 3.

Assist students with spelling as necessary.

### 4. (Activity 4-4) Food Webs.

REMEMBER WHEN WE PUT PICTURES OF PLANTS AND ANIMALS ON THE FLOOR AND PUT PIECES OF YARN BETWEEN THEM? WE MADE A FOOD WEB THAT SHOWED HOW LIVING THINGS DEPEND ON EACH OTHER FOR FOOD.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT HAPPENED WHEN ONE PLANT OR ANIMAL WAS TAKEN OUT OF THE FOOD WEB?

WRITE YOUR ANSWER UNDER QUESTION 4.

Assist students with spelling as necessary.

### 5. (Activity 4-6) Food Webs in Other Places.

WE SAW SOME SLIDES OF ANIMALS AND PLANTS THAT LIVE TOGETHER IN DIFFERENT PLACES AROUND THE WORLD.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT DID WE LEARN FROM THESE PICTURES?

## TEACHING STRATEGIES

BODY-BUILDING MATERIAL GET FROM  
G TO YOUR HAIR?

ANSWER ON THE LINES UNDERNEATH

With spelling as necessary.

4) Food Webs.

WE PUT PICTURES OF PLANTS AND  
THE FLOOR AND PUT PIECES OF YARN  
? WE MADE A FOOD WEB THAT SHOWED  
THINGS DEPEND ON EACH OTHER FOR

SHOW YOUR OPINION OF THIS ACTIVITY.

WHEN ONE PLANT OR ANIMAL WAS  
THE FOOD WEB?

ANSWER UNDER QUESTION 4.

With spelling as necessary.

6) Food Webs in Other Places.

SLIDES OF ANIMALS AND PLANTS THAT  
R IN DIFFERENT PLACES AROUND THE

SHOW YOUR OPINION OF THIS ACTIVITY.

LEARN FROM THESE PICTURES?

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-28

Students should:

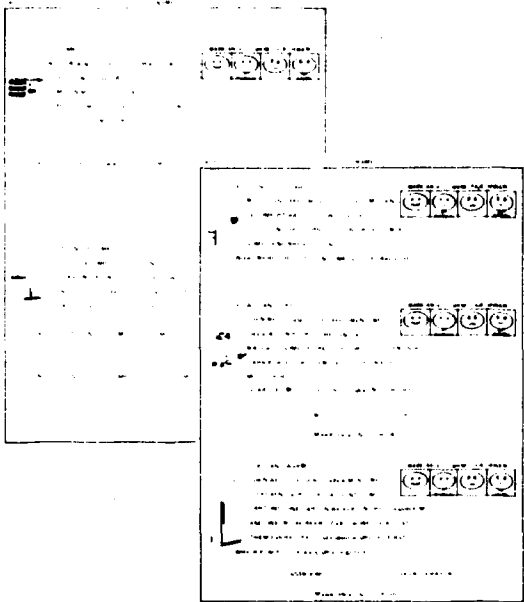
--write answers such as, "I ate it," "I ate  
hamburger," "Went into my stomach," etc.

--mark X's in the columns to indicate their  
opinions.

--write answers such as "Other animals died,"  
"Animals went hungry," and so on.

--mark an X in one of the opinion columns.

Worksheet 4-12



MARK AN X ON YOUR CHOICES. YOU MAY CHOOSE MORE THAN ONE. THE CHOICES ARE:

- A. ANIMALS NEED OTHER ANIMALS.
- B. ANIMALS NEED PLANTS.
- C. PLANTS NEED ANIMALS.
- D. FISH DON'T NEED ANYTHING ELSE.

Collect Worksheet 4-11 and distribute Worksheet 4-12.

6. (Activities 4-8 and 4-9) Decomposers.

WE SAW SOME SLIDES OF ANIMALS THAT EAT DEAD THINGS. THEN WE SET UP A HOUSE FOR SOME ANIMALS SO THAT WE COULD HAVE SOME DECOMPOSERS IN OUR CLASSROOM.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT SORT OF ANIMALS WERE THEY?

WRITE YOUR ANSWER ON THE LINE UNDER THIS QUESTION.

WHAT DID THESE ANIMALS DO THAT MADE US DECIDE THEY WERE DECOMPOSERS?

WRITE YOUR ANSWER ON THE LINES BELOW QUESTION 6.

Assist students with spelling as necessary.

7. (Activities 4-10 and 4-11) Planting in Compost.



## TEACHING STRATEGIES

X ON YOUR CHOICES. YOU MAY CHOOSE MORE  
E. THE CHOICES ARE:

IMALS NEED OTHER ANIMALS.

IMALS NEED PLANTS.

NTS NEED ANIMALS.

H DON'T NEED ANYTHING ELSE.

sheet 4-11 and distribute Worksheet 4-12.

ities 4-8 and 4-9) Decomposers.

SOME SLIDES OF ANIMALS THAT EAT DEAD  
THEN WE SET UP A HOUSE FOR SOME  
SO THAT WE COULD HAVE SOME DECOMPOSERS  
CLASSROOM.

X TO SHOW YOUR OPINION OF THIS  
Y.

RT OF ANIMALS WERE THEY?

OUR ANSWER ON THE LINE UNDER THIS  
N.

D THESE ANIMALS DO THAT MADE US  
THEY WERE DECOMPOSERS?

OUR ANSWER ON THE LINES BELOW QUESTION 6.

nts with spelling as necessary.

ities 4-10 and 4-11) Planting in Compost.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark an X on Choice A or B.

--mark an X in one of the opinion columns.

--write down, "Pill bugs," or "Worms."

--write answers such as, "They ate the leaves."

## MATERIALS

## TEACHING STRATEGIES

AFTER OUR COMPOST HAD BEEN GOING FOR SEVERAL WEEKS, WE TALKED ABOUT WHAT THINGS HAD DECOMPOSED AND WHAT THINGS HADN'T BROKEN DOWN AT ALL. THEN WE USED OUR COMPOST TO PLANT SEEDS.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT THINGS IN OUR COMPOST DECOMPOSED?

WRITE YOUR ANSWERS ON THE LINES UNDER THIS QUESTION.

WHAT THINGS IN OUR COMPOST DIDN'T DECOMPOSE?

WRITE YOUR ANSWERS ON THE LINES UNDER THIS QUESTION.

Assist students with spelling as necessary.

### 8. (Activity 4-12) Things That Breathe.

WE DID AN EXPERIMENT TO SEE IF SOMETHING IN COMPOST BREATHED. WE USED A TEST SOLUTION THAT TURNED GREEN OR YELLOW IF SOMETHING BREATHED INTO IT.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY

WHAT WERE THE THINGS IN COMPOST THAT BREATHED?

WRITE YOUR ANSWER ON THE LINE.

Assist students with spelling as necessary.

## TEACHING STRATEGIES

COMPOST HAD BEEN GOING FOR SEVERAL  
WEEKS. WE TALKED ABOUT WHAT THINGS HAD  
DECOMPOSED AND WHAT THINGS HADN'T BROKEN  
DOWN. THEN WE USED OUR COMPOST TO

SHOW YOUR OPINION OF THIS

IN OUR COMPOST DECOMPOSED?

ANSWERS ON THE LINES UNDER THIS

IN OUR COMPOST DIDN'T DECOMPOSE?

ANSWERS ON THE LINES UNDER THIS

With spelling as necessary.

-12) Things That Breathe.

EXPERIMENT TO SEE IF SOMETHING IN  
THE COMPOST BREATHED. WE USED A TEST SOLUTION  
THAT TURNED GREEN OR YELLOW IF SOMETHING  
WAS BREATHING IN IT.

SHOW YOUR OPINION OF THIS ACTIVITY

THE THINGS IN COMPOST THAT BREATHED?

ANSWER ON THE LINE.

With spelling as necessary.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-28

Students should:

--mark an X in one of the opinion columns.

--write such things as, "Grass," "Leaves," "Food."

--write such things as, "Plastic," "Glass,"  
"Metal," "Bottle caps."

--mark an X in one of the opinion columns.

--write, "Microbes."

9. (Activity 4-13) Wet and Dry.

THEN WE DID ANOTHER EXPERIMENT. WE PUT DRY FOOD IN PETRI DISHES AND ADDED WATER TO SOME OF THE DISHES. WE LEFT THEM IN A DARK PLACE FOR A FEW DAYS TO SEE WHICH GOT MOLDY FIRST.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

DID THE FOOD GET MOLDY FASTER IF IT WAS WET OR DRY?

MARK AN X ON YOUR CHOICE, WET OR DRY.

10. (Activity 4-14) Cool and Warm.

THEN WE DID A THIRD EXPERIMENT. WE PUT DIFFERENT SORTS OF FOODS INTO TWO CARTONS. ONE CARTON WE KEPT IN THE CLASSROOM AND ONE IN THE REFRIGERATOR. WE LOOKED AT THEM EVERY DAY TO SEE WHICH SPOILED FIRST.

MARK AN X ON THE WORKSHEET TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHICH PLACE DID FOODS SPOIL FASTER?

MARK AN X ON YOUR CHOICE, CLASSROOM OR REFRIGREATOR.

Collect Worksheet 4-12 and distribute Worksheet 4-13.

11. (Activity 4-17) Baking Bread.

REMEMBER WHEN WE BAKED OUR OWN BREAD? WE MADE FOUR LOAVES, AND TWO LOAVES WERE TALLER THAN THE OTHERS AFTER WE FINISHED.

Worksheet 4-13

Worksheet 4-13 is a student worksheet for the 'Wet and Dry' experiment. It contains the following sections:

- NAME:** A line for the student's name.
- DATE:** A line for the date.
- QUESTIONS:** A list of questions related to the experiment, such as 'Did the food get moldy faster if it was wet or dry?' and 'Which place did foods spoil faster?'. Each question is followed by a series of five smiley face icons (happy, neutral, sad, very sad, very happy) for the student to mark their opinion.
- ANSWERS:** A section for the student to write their answers to the questions.

## TEACHING STRATEGIES

Activity 4-13) Wet and Dry.

WE DID ANOTHER EXPERIMENT. WE PUT DRY  
IN PETRI DISHES AND ADDED WATER TO SOME  
E DISHES. WE LEFT THEM IN A DARK PLACE  
FEW DAYS TO SEE WHICH GOT MOLDY FIRST.

AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

HE FOOD GET MOLDY FASTER IF IT WAS WET  
Y?

AN X ON YOUR CHOICE, WET OR DRY.

Activity 4-14) Cool and Warm.

WE DID A THIRD EXPERIMENT. WE PUT DIFFERENT  
OF FOODS INTO TWO CARTONS. ONE CARTON WE  
IN THE CLASSROOM AND ONE IN THE REFRIGERATOR.  
LOOKED AT THEM EVERY DAY TO SEE WHICH SPOILED

AN X ON THE WORKSHEET TO SHOW YOUR OPINION  
IS ACTIVITY.

PLACE DID FOODS SPOIL FASTER?

AN X ON YOUR CHOICE, CLASSROOM OR  
GREATOR.

Worksheet 4-12 and distribute Worksheet 4-13.

Activity 4-17) Baking Bread.

WER WHEN WE BAKED OUR OWN BREAD? WE MADE  
LOAVES, AND TWO LOAVES WERE TALLER THAN THE  
S AFTER WE FINISHED.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark an X in one of the opinion columns.

--mark an X on wet.

--mark an X in one of the opinion columns.

--mark an X on "classroom."

## MATERIALS

## TEACHING STRATEGIES

MARK AN X TO SHOW WHETHER YOU LIKED THIS ACTIVITY, WERE NOT INTERESTED, DISLIKED IT, OR DON'T REMEMBER IT.

WHY WERE TWO LOAVES TALLER?

- A. THE TALLER LOAVES HAD YEAST.
- B. THE SHORTER LOAVES HAD YEAST.
- C. THERE WERE BAD MICROBES IN THE SHORTER LOAVES.
- D. SOMETHING ATE THE SHORTER LOAVES.

MARK AN X ON YOUR CHOICE.

### 12. (Activity 4-18) Food Cycles.

CHOOSE ONE OF THE WORDS TO WRITE IN THE BLANK TO MAKE THIS INTO A FOOD CYCLE: MOUNTAIN LION, DEER, GRASS.

THE WORDS ARE: FROG, SNAKE, DECOMPOSER, MAN, FRUIT.

### 13. (Activity 4-29) Garbage.

WHEN WE STARTED LEARNING ABOUT GARBAGE WE SAW A FILM.

MARK AN X ON YOUR WORKSHEET TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT DID THIS FILM SHOW US?

- A. GARBAGE IS PRETTY.
- B. GARBAGE IS UGLY.
- C. THERE IS TOO MUCH GARBAGE.

## TEACHING STRATEGIES

SHOW WHETHER YOU LIKED THIS  
RE NOT INTERESTED, DISLIKED IT,  
MBER IT.

LOAVES TALLER?

ER LOAVES HAD YEAST.

ER LOAVES HAD YEAST.

RE BAD MICROBES IN THE SHORTER LOAVES.

G ATE THE SHORTER LOAVES.

YOUR CHOICE.

18) Food Cycles.

THE WORDS TO WRITE IN THE BLANK  
INTO A FOOD CYCLE: MOUNTAIN  
GRASS.

: FROG, SNAKE, DECOMPOSER,

29) Garbage.


ED LEARNING ABOUT GARBAGE WE

YOUR WORKSHEET TO SHOW YOUR  
IS ACTIVITY.

FILM SHOW US?

S PRETTY.

S UGLY.

TO  GARBAGE.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-28

Students should:

--mark an X in one of the opinion columns.

--mark an X on A.

--write, "Decomposer."

--mark an X in one of the opinion columns.

## Worksheet 4-14

[illegible]

D. THERE IS NOT ENOUGH GARBAGE.

E. GARBAGE SHOULD BE LEFT AROUND.

MARK AN X ON YOUR CHOICES.

YOU MAY CHOOSE MORE THAN ONE.

14. (Activities 4-21 and 4-22) Sorts of Garbage.

WE COLLECTED ALL THE TRASH FROM OUR CLASSROOM  
AND WEIGHED IT. THEN WE SAW SOME SLIDES OF A  
FAMILY'S GARBAGE.

MARK AN X TO SHOW YOUR OPINION.

## WHAT SORTS OF GARBAGE WILL DECOMPOSE?

A. CANS, B. BOTTLES, C. PAPER, D. FOOD,  
E. WOOD, F. PLASTIC

MARK AN X ON YOUR CHOICES. YOU MAY CHOOSE MORE THAN ONE.

15. (Activity 4-23) It's a Real Dump.

REMEMBER WHEN WE TOOK OUR FIELD TRIP TO THE  
GARBAGE DUMP? MARK AN X TO SHOW YOUR OPINION  
OF THIS ACTIVITY.

WHAT THINGS IN THE GARBAGE COULD HAVE BEEN RECYCLED?

A. CANS, B. BOTTLES C. PAPER D. FOOD  
E. WOOD F. PLASTIC

MARK AN X ON YOUR CHOICES. YOU MAY CHOOSE MORE THAN ONE.

Collect Worksheet 4-13 and distribute Worksheet 4-14.



## TEACHING STRATEGIES

ERE IS NOT ENOUGH GARBAGE.

RBAGE SHOULD BE LEFT AROUND.

N X ON YOUR CHOICES.

Y CHOOSE MORE THAN ONE.

ivities 4-21 and 4-22) Sorts of Garbage.

LECTED ALL THE TRASH FROM OUR CLASSROOM  
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'S GARBAGE.

N X TO SHOW YOUR OPINION.

ORTS OF GARBAGE WILL DECOMPOSE?

NS, B. BOTTLES, C. PAPER, D. FOOD,  
OD, F. PLASTIC

N X ON YOUR CHOICES. YOU MAY CHOOSE  
HAN ONE.

ivity 4-23) It's a Real Dump.

ER WHEN WE TOOK OUR FIELD TRIP TO THE  
E DUMP? MARK AN X TO SHOW YOUR OPINION  
S ACTIVITY.

HINGS IN THE GARBAGE COULD HAVE BEEN  
ED?

NS, B. BOTTLES C. PAPER D. FOOD  
OD F. PLASTIC

N X ON YOUR CHOICES. YOU MAY CHOOSE MORE  
NE.

ERIC-13 and distribute Worksheet 4-14.

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark an X on B and C.

--mark an X in one of the opinion columns.

--mark an X on C, D, and E.

--mark an X in the opinion columns.

--mark an X on A, B, C, and E.

## MATERIALS

## TEACHING STRATEGIES

### 16. (Activity 4-24) Every Litter Bit Helps.

WE DID A PROJECT TO HELP KEEP OUR NEIGHBORHOOD CLEAN.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT CAN YOU DO TO CUT DOWN ON THE AMOUNT OF GARBAGE?

- A. PUT GARBAGE IN THE TRASH CAN.
- B. DON'T USE THINGS THAT CAN'T BE RECYCLED.
- C. SAVE THINGS TO BE RECYCLED.
- D. DON'T RECYCLE ANYTHING.

MARK AN X ON YOUR CHOICES. YOU MAY CHOOSE MORE THAN ONE.

### 17. (Activity 4-25) The Recycling Payoff Game.

REMEMBER WHEN WE PLAYED THE RECYCLING PAYOFF GAME? WE DRILLED FOR OIL, GOLD, LEAD, AND OTHER THINGS.

MARK AN X TO SHOW YOUR OPINION OF THIS ACTIVITY.

WHAT WAS THE BEST WAY TO WIN THE GAME?

- A. BUY LAND.
- B. RECYCLE YOUR RIG.
- C. SELL YOUR RIG.
- D. SELL YOUR LAND.

## TEACHING STRATEGIES

4-24) Every Litter Bit helps.

OBJECT TO HELP KEEP OUR NEIGHBORHOOD

DO SHOW YOUR OPINION OF THIS

DO DO TO CUT DOWN ON THE AMOUNT

BAGE IN THE TRASH CAN.

SE THINGS THAT CAN'T BE RECYCLED.

INGS TO BE RECYCLED.

ECYCLE ANYTHING.

W YOUR CHOICES. YOU MAY CHOOSE MORE

4-25) The Recycling Payoff Game.

EN WE PLAYED THE RECYCLING PAYOFF  
RILLED FOR OIL, GOLD, LEAD, AND  
S.

DO SHOW YOUR OPINION OF THIS ACTIVITY.

C BEST WAY TO WIN THE GAME?

YOUR RIG.

R RIG.

R LAND.

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-28

Students should:

--mark an X in one of the opinion columns.

--mark an X on B and C.

--mark an X in one of the opinion columns.

MATERIALS

TEACHING STRATEGIES

MARK AN X ON YOUR CHOICE.

Collect Worksheet 4-14.

Tell the students that tomorrow they can talk about the answers to the questions on the four worksheets. Then if they want to work again on any activity they talked about today, they may do so.

After class, turn to the Responsibilities and Accomplishments page of the Student Record of Progress and enter your judgment of each student's interest and involvement in science. Then, use an extra set of worksheets for Part I to tally the student ratings of each of the activities.

Look for the most popular and least popular activities. Then look over each worksheet to find out which students indicated the least interest in science. Compare this with your own ratings of each student's interest.

If you have students who frequently indicated disinterest, dislike, or no memory for a number of activities, it is possible that they are trying to indicate personal, social, or emotional problems rather than simply that they don't like science. Bear in mind that part of the problem might be you -- a personality conflict that may not be easily resolved. Whatever the cause, these students need attention and understanding. Look at your records of background and understanding for clues. Visit their homes. Review their school placement. In the next unit try to draw them into the activities. Use Tallysheet 4-8 to summarize student responses to the questions on Worksheets 4-11 through 4-14. Then use the tallysheet and the guidelines that follow (preceeding Part II of this activity) to record the results on Worksheets 4-11, 4-12, 4-13, and 4-14. As you record the results,

## TEACHING STRATEGIES

X ON YOUR CHOICE.

sheet 4-14.

Students that tomorrow they can talk about the questions on the four worksheets. Then to work again on any activity they talked they may do so.

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nts page of the Student Record of Progress  
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elines that follow (preceeding Part II  
vi record the results on Worksheets  
4-14. As you record the results,

## ANTICIPATED STUDENT BEHAVIORS

Students should:

--mark an X on B.

## MATERIALS

## TEACHING STRATEGIES

write occasional comments or words of praise on the worksheets (which should be returned to the students the next day).

### Guidelines for Scoring Worksheets 4-11, 4-12, 4-13, and 4-14.

The outline below will assist you in scoring student responses on Tallysheet 4-8.

Questions 5, 11, 13, 14, 15, 16, and 17: Circle the letters that each student marks.

Question 1: Circle the number of things that each student listed as going into compost.

Question 2. Circle SNAKE and/or GRASS if the student marked them. Circle OTHER for any other answer the student marked.

Question 3. Circle YES if the student indicates that the body-building material was passed to the hair by eating the meat from the cow. Otherwise, circle NO.

Question 4: Circle YES if the student indicates some effect on other plants and/or animals. Otherwise, circle NO.

Question 6: Under the column marked "Name," circle YES if the student correctly names the animal. Otherwise, circle NO. Under the column marked "Function," circle YES if the student indicated that the animal ate the leaves. Otherwise, circle NO.

Question 7: Under the column marked "Decomposed," circle the number of things the student listed as things that were decomposed. Under the column marked "NOT Decomposed," circle the number of things that the student listed as things that were not decomposed.

## TEACHING STRATEGIES

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-28

comments or words of praise on the  
h should be returned to the students

Scoring Worksheets  
, and 4-14.

w will assist you in scoring student  
lysheet 4-8.

13, 14, 15, 16, and 17: Circle the  
h student marks.

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g material w s passed to the hair by  
from the cow. Otherwise, circle NO.

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plants and/or animals. Otherwise,

er the column marked "Name," circle YES  
orrectly names the animal. Otherwise,  
r the column marked "Function," circle  
nt indicated that the animal ate the  
se, circle NO.

er the column marked "Decomposed,"  
r of things the student listed as  
decomposed. Under the column  
mposed," circle the number of things  
listed as things that were not

Question 8: Circle YES if the student wrote microbes. Otherwise, circle NO.

Question 9: Circle YES if the student marked wet. Otherwise, circle NO.

Question 10: Circle YES if the student marked the classroom. Otherwise, circle NO.

Question 12: Circle YES if the student wrote decomposer.

Guidelines for Interpretation and Recording  
in the Student Record of Progress

The items in this review assess an understanding of the concepts in this unit. Some, in addition, assess a higher level of abstract thinking and are used to identify the students who have developed their reasoning skills.

The following instructions will help you interpret scores and record results in the Student Record of Progress.

Question 1 assesses the student's understanding of the concept of compost and his memory regarding what things were put into the compost pile. Turn to the Concepts page of the Student Record of Progress and find the column marked "Activity 4-28, Compost." Based on the number of things that your class added to the compost piles, rate each student's response as HIGH, SOME, or LOW.

Question 2 assesses the student's understanding of the concept of food chains. Find the column marked "Activity 4-28, Food Chains" on the concepts page. Circle HIGH if the student marked both SNAKE and GRASS. Circle SOME if he/she marked one of the two. Circle LOW if he/she marked neither of the two.



## TEACHING STRATEGIES

1: Circle YES if the student wrote microbes.  
circle NO.

2: Circle YES if the student marked wet.  
circle NO.

3: Circle YES if the student marked the  
Otherwise, circle NO.

4: Circle YES if the student wrote

### for Interpretation and Recording Student Record of Progress

In this review assess an understanding of the  
in this unit. Some, in addition, assess a  
level of abstract thinking and are used to  
the students who have developed their  
skills.

Following instructions will help you interpret  
record results in the Student Record of

assesses the student's understanding of  
of compost and his memory regarding what  
put into the compost pile. Turn to the  
page of the Student Record of Progress  
the column marked "Activity 4-28, Compost."  
the number of things that your class added  
compost piles, rate each student's response as  
or LOW.

assesses the student's understanding of the  
food chains. Find the column marked  
"4-28, Food Chains" on the concepts page.  
if the student marked both SNAKE and  
circle SOME if he/she marked one of the two.  
if he/she marked neither of the two.

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

Question 3 assesses the student's understanding of the concept of the transfer of body-building materials from one organism to another. Find the column marked "Activity 4-28, Long Journey" on the Concepts page. Circle YES if the student answered question 3 correctly.

Question 4 assesses the student's understanding of the concept of food webs. In addition, this question assesses a student's ability to predict outcomes. Because predicting outcomes involves a higher degree of abstract thinking, some students will not be successful in this task. Students who are not able to predict outcomes will need time and many experiences to develop these skills. Find the column marked "Activity 4-28, Food Web" on the Concepts page. Circle YES if the student's answer indicates that other animals would be affected in some way, such as going hungry or dying. Otherwise, circle NO.

Question 5 assesses the student's understanding of the concept of interdependence of living things. Find the column marked "Activity 4-28, Interdependence" on the Concepts page. Circle YES if the student marked both choices A and B. Otherwise, circle NO.

Question 6 assesses the student's understanding of the concept of decomposers. Find the column marked "Activity 4-28, Decomposers" on the Concepts page. Circle YES if the student had indicated the function of decomposers. Otherwise, circle NO.

Question 7 assesses the student's understanding of planting in compost by asking students which items decomposed and which did not. Find the column marked "Activity 4-28, Planting in Compost" on the Concepts page. Based upon the number of things in each category in your class, rate each student's response as HIGH, SOME, or LOW.

## TEACHING STRATEGIES

es the student's understanding of the transfer of body-building materials to another. Find the column marked "Long Journey" on the Concepts page. student answered question 3 correctly.

es the student's understanding of the webs. In addition, this question t's ability to predict outcomes. g outcomes involves a higher degree of , some students will not be successful udents who are not able to predict out- ime and many experiences to develop nd the column marked "Activity 4-28, Concepts page. Circle YES if the indicates that other animals would be way, such as going hungry or dying. NO.

es the student's understanding of the ependence of living things. Find the tivity 4-28, Interdependence" on the rcle YES if the student marked both Otherwise, circle NO.

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es the student's understanding of t by asking students which items ch did not. Find the column marked anting in Compost" on the Concepts the number of things in each category e each student's response as HIGH,

## ANTICIPATED STUDENT BEHAVIORS

ACTIVITY  
4-28

**MATERIALS**

**TEACHING STRATEGIES**

Question 8 assesses the student's understanding of the concept that microbes breathe. Find the column marked "Activity 4-28, Things that Breathe" on the Concepts page. Circle YES if the student had indicated that it was microbes that were breathing. Otherwise, circle NO.

Questions 9 and 10 assess the student's understanding of the concept of the conditions which contribute to the decomposition of food. Find the column marked "Activity 4-28, Decomposing Conditions" on the Concepts page. Circle YES if the student marked both Questions 9 and 10 correctly. Otherwise, circle NO.

Question 11 assesses the student's understanding of the concept that yeast causes bread to rise. Find the column marked "Activity 4-28, Baking Bread" on the Concepts page. Circle YES if the student marked choice A. Otherwise, circle NO.

Question 12 assesses the student's understanding of the concept of food cycles. Find the column marked "Activity 4-28, Food Cycles" on the Concepts page. Circle YES if the student wrote decomposer. Otherwise, circle NO.

Question 13 assesses the student's understanding of the concept of the amount and look of garbage we produce. Find the column marked "Activity 4-28, Garbage." Circle YES if the student marked choices B and C. Otherwise, circle NO.

Question 14 assesses the student's understanding of the concept that some things in garbage decompose, while others do not. Find the column marked "Activity 4-28, Decomposers" on the Concepts page. Circle YES if the student marks choices C, D, and E and no others as things that will decompose. Otherwise, circle NO.

Question 15 assesses the student's understanding of the concept of recycling. Find the column marked "Activity 4-28, Recycling" on the Concepts page. Circle YES if the student marks choices A, B, C, and E and no others as

## TEACHING STRATEGIES

8 assesses the student's understanding of the that microbes breathe. Find the column marked by 4-28, "Things that Breathe" on the Concepts page. Circle YES if the student had indicated that it microbes that were breathing. Otherwise, circle NO.

9 and 10 assess the student's understanding of cept of the conditions which contribute to the sition of food. Find the column marked "Activity ecomposing Conditions" on the Concepts page. YES if the student marked both Questions 9 and 10 ly. Otherwise, circle NO.

11 assesses the student's understanding of the that yeast causes bread to rise. Find the marked "Activity 4-28, Baking Bread" on the e page. Circle YES if the student marked choice erwise, circle NO.

12 assesses the student's understanding of the of food cycles. Find the column marked "Activity ood Cycles" on the Concepts page. Circle YES tudent wrote decomposer. Otherwise, circle NO.

13 assesses the student's understanding of the of the amount and look of garbage we produce. e column marked "Activity 4-28, Garbage." Circle he student marked choices B and C. Otherwise, 10.

14 assesses the student's understanding of ept that some things in garbage decompose, while o not. Find the column marked "Activity 4-28, ers" on the Concepts page. Circle YES if the marks choices C, D, and E and no others s that will decompose. Otherwise, circle NO.

15 assesses the student's understanding of the of recycling. Find the column marked "Activity ycling" on the Concepts page. Circle YES if the m choices A, B, C, and E and no others as

## ANTICIPATED STUDENT BEHAVIORS

## MATERIALS

## TEACHING STRATEGIES

things that could have been recycled. Otherwise, circle NO.

Question 16 assesses the student's understanding of the concept of how to reduce the amount of garbage. Find the column marked "Activity 4-28, Less Garbage" on the Concepts page. Circle YES if the student marked choices B and C and no others as ways to reduce the amount of garbage. Otherwise, circle NO.

Question 17 again assesses the concept of recycling. Recycling in this case is assessed in terms of the best way to win the Recycling Payoff Game. Find the column marked "Activity 4-28, Recycling Payoff Game" on the Concepts page. Circle YES if the student marked B, Recycle Your Rig, as the best way to win the game. Otherwise, circle NO.

### Part II.

As you return the worksheets from Part I to the students, congratulate them on what they have learned.

FOR A LITTLE WHILE LET'S TALK ABOUT THE QUESTIONS YOU ANSWERED. AS WE GO ALONG, I WILL TELL YOU WHICH ACTIVITIES WERE THE MOST POPULAR. YOU CAN CHOOSE A FEW FAVORITES TO DO AGAIN IF YOU WOULD LIKE. NOW LOOK AT QUESTION 1. WHO WANTS TO TELL THE ANSWER?

  
GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND

If for Question 1, or later questions, some students have a reasonable justification for an answer that you had

## TEACHING STRATEGIES

have been recycled. Otherwise, circle

ses the student's understanding  
how to reduce the amount of garbage.  
arked "Activity 4-28, Less Garbage" on  
. Circle YES if the student marked  
and no others as ways to reduce the  
. Otherwise, circle NO.

assesses the concept of recycling.  
case is assessed in terms of the best  
cycling Payoff Game. Find the column  
4-28, Recycling Payoff Game" on the  
ircle YES if the student marked B,  
as the best way to win the game.  
NO.

worksheets from Part I to the students,  
on what they have learned.

WHILE LET'S TALK ABOUT THE  
ANSWERED. AS WE GO ALONG, I  
WHICH ACTIVITIES WERE THE  
YOU CAN CHOOSE A FEW FAVORITES  
IF YOU WOULD LIKE. NOW LOOK AT  
WHO WANTS TO TELL THE ANSWER?

or later questions, some students have  
fication for an answer that you had

## ANTICIPATED STUDENT BEHAVIORS:

ACTIVITY  
4-28

Students should:

raise hands to tell things that were put in the  
compost..

  
GIVE SEVERAL  
STUDENTS A CHANCE  
TO RESPOND

**MATERIALS**

**TEACHING STRATEGIES**

scored incorrect, be sure to change your rating and praise their good thinking.

Discuss each of the questions fully, allowing students to give all their various answers and giving them the opportunity to decide which is correct. Have students challenge and defend the answers. (Refer to guidelines for scoring the worksheets for acceptable answers to each question.) For each question, discuss the popularity of the activity it was drawn from and let students choose several activities to repeat if they wish.

Please send all student worksheets and Tallysheet 4-8 to BSCS.



## TEACHING STRATEGIES

Correct, be sure to change your rating and praise thinking.

Ask of the questions fully, allowing students to give their various answers and giving them the opportunity to decide which is correct. Have students explain and defend the answers. (Refer to guidelines on the worksheets for acceptable answers to questions.) For each question, discuss the popularity of the activity it was drawn from and let students choose activities to repeat if they wish.

Hand out all student worksheets and Tallysheet 4-8

## ANTICIPATED STUDENT BEHAVIORS

*Upon completion of this activity, each student should, as a minimum:*

- have participated in a review of Unit IV*
- have responded to Worksheets 4-11 through 4-14*
- have participated in a discussion of answers to the questions on the worksheets.*

Activity name suggested by class:

Teacher \_\_\_\_\_

BSCS USE: Post \_\_\_ Tally \_\_\_ Rev \_\_\_

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
1. Date taught (month and date, e.g. 11/2)						
2. Minutes of class time on science each day						
3. Minutes preparing for each day's science class						
4. Students absent on each date (Use ID Number)						

5. Student interest: Check the portion of your class in each category.

	NONE	UP TO: 1/4	1/2	3/4	ALL
HIGH INTEREST					
MODERATE INTEREST OR INDIFFERENCE					
RESISTANCE OR DISLIKE					

6. Equipment problems? In kit? ☐ No ☐ Yes Obtained by you? ☐ No ☐ Yes  
If problems, what were they and how would you resolve them?

7. Did students have difficulty understanding any concepts or vocabulary?  
☐ No ☐ Yes -- Pages and Problem:

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?

9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:

10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:

11. Your rating of this activity:

☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it

If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Were there any activities which few of the students recalled?

13. How do the students react to these assessment sheets?

8. Will the knowledge gained from this activity be something the students will use in their everyday life? If not, how could the activity be made more practical?
9. Were teacher instructions clear enough to follow? ☐ Yes ☐ No -- Pages and Problem:
10. Did you omit any part(s) of this activity? ☐ Yes ☐ No -- Identify which part(s) were omitted and WHY:
11. Your rating of this activity:  
☐ Worthwhile ☐ Of value--needs the ☐ Worth salvaging--make ☐ Worthless  
--keep as is revision suggested major changes described --drop it
- If revision is suggested, what parts of this activity should be retained unchanged when the curriculum is revised? Page(s) \_\_\_\_\_ Comment:

Specific Questions:

12. Were there any activities which few of the students recalled?
13. How do the students react to these assessment sheets?
14. Please send in Tallysheet 4-8 and Worksheets 4-11 through 4-14.

Teacher \_\_\_\_\_

- A. In the space below tell what went right, what went wrong, what you did to make the activity a success, and specifically how you would rewrite the activity. Whenever practical write all over your second copy of the Guide. Tear out the activity and send the annotated Guide along with this form.

- B. What anecdotes of student learning did you see or hear in your classroom?

Concern (or questions) about content:

B. What anecdotes of student learning did you see or hear in your classroom?

C. Concern (or questions) about content:

D. Messages for staff (we will read and respond immediately):

Have you answered each question, attached annotated Guide, your revisions, student work, tallysheets, etc?

1. Was the background information for this core clear and useful? ☐ Yes ☐ No  
Comment:
2. Was there too much preparatory reading and too many directions given to the teacher? ☐ Yes ☐ No  
Comment:
3. Was it clear to you why these particular activities were chosen and the direction they were leading? ☐ Yes ☐ No
4. How would you increase the clarity of this core for students? (Help them understand why they are doing these activities.)
5. Is there a practical (take-home) value for your students in these activities?  
☐ Yes ☐ No If yes, what do you see as the "take-home" lesson? If no, what is needed?
6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?  
☐ Yes ☐ No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? ☐ Yes ☐ No  
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? ☐ Yes ☐ No  
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? ☐ Yes ☐ No  
Comment:

6. In these materials, what things did your students find difficult to do?
7. Comment about the amount of reading and writing required of students. Should there be more or less in this core?
8. Were the Clues to Success and Student Record of Progress helpful in this core?  
☐ Yes ☐ No If helpful, how are they helpful?
9. Did you make use of the Planning Guide included in the introductory material for this core? ☐ Yes ☐ No  
Comment:
10. During this core was class time taken for students to observe the pond, pets, or plants; play games from earlier activities, or explore science ideas not in the materials? ☐ Yes ☐ No  
Comment:
11. If you could teach your way, rather than following the Guide, how would you do it?
12. Did the activities fulfill the purposes described by the core objectives and rationale? ☐ Yes ☐ No  
Comment:
13. Which of your students do you believe were unsuccessful in achieving the objectives of this core of activities? Explain:

## NEW STUDENTS ENTERING DURING THIS CO

Date Entered	Last Name	Name Used	Ethnic Group	Sex	Birthdate	Test Date	Test
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B
			W B S O	M F			W B

W = white  
 B = black  
 S = Spanish-  
 American  
 O = other

W=WIS  
 B=Bin  
 O=Oth  
 (Na

## STUDENTS DROPPED IN THIS PERIOD

Date Dropped	Last Name	First	Reason for Dropping



NEW STUDENTS ENTERING DURING THIS CORE

Group	Sex	Birthdate	Test Date	Test	Total	Verbal	Performance	Previous Test Score
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				
S O	M F			W B O				

White  
Black  
Spanish-  
American  
Other

W=WISC  
B=Binet  
O=Other  
(Name)

Reason for Dropping



## Me and my Environment

### UNIT IV TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT CHANGE OF PACERS

Camera  
Film

1. Have students, working in groups of three or four, use a camera with which to build a photographic food chain. To some groups add the chain with man. Permit the more capable students to start the chain with the plant source. Encourage students to try for a chain as long as possible. A group of students will be able to work at a time because of limited work between classes, during free periods, at lunch break,

Labels and safety pins

2. Build a food chain involving one of the classroom pets. Use labels and safety pins.
3. Who am I? Pin cards on students' backs, without their seeing them. The animal from the Food Chain Game. Students ask each other "Who do I eat?" in order to guess what plant or animal they are.

Camera  
Film

4. Students may wish to photograph the food web that has been built. If more than one student wishes to do this, a new arrangement of the food web. Display the pictures on the bulletin board.
5. Have the students determine which living things in the local area are living things. Construct as long a list as possible.

Example:      Cats ----- Rats  
                 Birds ----- Insects  
                 Gulls ----- Fish

Baby food jars or similar small jars  
Plastic bags

6. During the field trip (Activity 4-5) it might be possible to collect plants or animals for their pond. Bring appropriate containers such as jars, etc.
7. Plants collected on the field trip (Activity 4-5) may be used to display on the bulletin board.
8. On a large U. S. or world map have the students write in the area(s) where they are most commonly found.

Map of world and/or United States

UNIT IV  
TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT  
CHANGE OF PACERS



BSCS

nts, working in groups of three or four, use a camera to take appropriate pictures to build a photographic food chain. To some groups you may give the hint to start with man. Permit the more capable students to start with any animal and proceed to source. Encourage students to try for a chain as long as possible. Only one group s will be able to work at a time because of limited equipment. Permit students to en classes, during free periods, at lunch break, and so forth. Activity 4-1

od chain involving one of the classroom pets. Use pictures or drawings. Activity 4-1

Pin cards on students' backs, without their seeing the card, to depict a plant or n the Food Chain Game. Students ask each other questions such as "Who eats me?" eat?" in order to guess what plant or animal they are. Activity 4-1

ay wish to photograph the food web that has been constructed on the floor. If more tudent wishes to do this, a new arrangement of the cards could be used to build a web. e pictures on the bulletin board. Activity 4-4

tudents determine which living things in the local environment feed on which other ngs. Construct as long a list as possible. Activity 4-4

Example:      Cats ----- Rats  
                 Birds ----- Insects  
                 Gulls ----- Fish

field trip (Activity 4-5) it might be possible for the students to collect plants for their pond. Bring appropriate containers such as jars, plastic bags, water, Activity 4-5

lected on the field trip (Activity 4-5) may be used to make an interesting display etin board. Activity 4-5

U. S. or world map have the students write in their names of the animals studied a(s) where they are most commonly found. Activity 4-6



## Me and my Environment

### UNIT IV TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT CHANGE OF PACERS

\*Magazine pictures

9. Have students collect pictures of wild animals in or together on a bulletin board and connected with line group lion, zebra, antelope, hyena, etc.

\*Magazine pictures

10. Students could make a bulletin board with pictures of animals seen in slides.

\*Plastic shoe box

\*Pill bugs

\*Cardboard divider

\*Dead leaves

\*Damp sponge

\*Drying agent - borax, silica gel

11. An experiment could be conducted to discover whether place a cardboard divider in the middle of a plastic bottom of the divider to allow pill bugs to walk through etc., on either side of the divider, but place a damp A drying agent can be placed in a corner of the "dry" would be silica gel, borax, or calcium chloride. (S) observe the pill bugs to see which side of the box they

Microscope

Microscope slides

\*Compost

12. Have students look at any mold in the compost under

13. Invite a professional gardener, hobby gardener, or member of the class about the preparation, use, and benefits of composting should be stressed.

UNIT IV  
TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT  
CHANGE OF PACERS



BSCS

Students collect pictures of wild animals in other parts of the world, to be grouped  
together on a bulletin board and connected with lines showing a possible food web; e.g.,  
lion, zebra, antelope, hyena, etc.

Activity 4-6

Students could make a bulletin board with pictures of decomposers and scavengers, including  
those seen in slides.

Activity 4-8

Experiment could be conducted to discover whether pill bugs prefer wet or dry environments:  
Place a cardboard divider in the middle of a plastic shoe box, with small holes cut in the  
center of the divider to allow pill bugs to walk through. Place similar amounts of leaves,  
moss, or other organic material on either side of the divider, but place a damp sponge on one side and not the other.  
A drying agent can be placed in a corner of the "dry" compartment. A suitable drying agent  
could be silica gel, borax, or calcium chloride. (See Diagram CP 4-1.) Students should  
observe the pill bugs to see which side of the box they spend the most time in.

Activity 4-9

Students look at any mold in the compost under the microscope.

Activity 4-10

Have a professional gardener, hobby gardener, or nurseryman who uses compost to speak to the  
class about the preparation, use, and benefits of composting. The recycling aspects of  
composting should be stressed.

Activity 4-10

Activity 4-11



## Me and my Environment

### UNIT IV TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT CHANGE OF PACERS

Agar  
Petri dishes  
Water  
Pan  
Hot plate  
Q-tips  
Compost  
Incubator or warm place

Materials in 14  
Refrigerator  
Magazine pictures

14. It might be a good review for students to make agar plates. A biology teacher in your school may be a good source of agar. Have students wipe Q-tips in the compost and then on the surface of a warm place. Students who missed Unit II, or cannot recall the compost microbes growing.
15. Make agar plates with compost microbes as suggested in 14. Store one in the refrigerator and one in a warm place. This will be useful in Unit II.
16. Have students make a bulletin board display using advertisements according to where they are stored: refrigerator, cool dry place, etc.
17. Visit the school cafeteria and compare the food-storing practices with a grocery store the class visited.
18. Divide the class into groups of two, three, or four. Have each group write a note to the manager of the grocery store visited by the group.
19. Arrange a field trip to a canning or bottling factory to see how food is taken against spoilage.
20. The bread-making activity will probably get students interested. More baking may be tried with other yeast recipes, or cooking lessons. Boys as well as girls may well enjoy this.

UNIT IV  
TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT  
CHANGE OF PACERS



BSCS

a good review for students to make agar plates as described in Unit II. (The teacher in your school may be a good source of agar if you have none left.) Have the Q-tips in the compost and then on the surface of the agar, and incubate in the dark. Students who missed Unit II, or cannot recall it, will be interested to see the microbes growing.

Activity 4-12

Agar plates with compost microbes as suggested in 14 above, and store one in the refrigerator and one in a warm place. This will be useful for students who have missed the previous activity.

Activity 4-14

Students make a bulletin board display using advertisements. Group food products and list where they are stored: refrigerator, cool dry cabinets, etc.

Activity 4-15

Visit a school cafeteria and compare the food-storing procedures with those of the school visited.

Activity 4-15

Divide the class into groups of two, three, or four. Have the groups write a thank you note to the manager of the grocery store visited by the class. Give help as needed.

Activity 4-15

Field trip to a canning or bottling factory to study the procedures and measures to prevent spoilage.

Activity 4-15

Baking activity will probably get students interested in cooking. In other activities, baking may be tried with other yeast recipes, and this could lead into regular projects. Boys as well as girls may well enjoy this.

Activity 4-17



## Me and my Environment

### UNIT IV TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT CHANGE OF PACERS

Food Chain Game cards

\*Pin

\*Cardboard

\*Scissors

21. If students have difficulty understanding food cycle might help. Cut two large circles out of cardboard, through which a large pin could be pushed to make an window near the edge of one circle large enough to see food cycle made of Food Chain Game cards around the way that they will show through the window of the film together, rotate the top circle as you describe the

\*Magazine pictures

22. Have students find pictures of animals to make into complete the cycle.

Spring scale

23. Have students collect trash from the wastebaskets in what is collected.

Spring scale

\*Plastic bags to use as gloves

24. Open one or more bags of classroom trash and have students sort as paper, glass, plastic, metal, food. These categories biodegradable and nonbiodegradable materials.

Spring scale

25. Weigh the trash from the lunch room after one lunch total over a period of weeks or months.

\*Camera and film

26. Photograph and/or display the bags of trash that have the total school trash for one day.



UNIT IV  
TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT  
CHANGE OF PACERS



Students have difficulty understanding food cycles, the construction of a cardboard "cycle" Activity 4-1  
t. help. Cut two large circles out of cardboard, and make a small hole in the center  
ugh which a large pin could be pushed to make an axle. (See Diagram CP 4-2.) Cut a  
ow near the edge of one circle large enough to show a Food Chain Game card. Stick a  
ycle made of Food Chain Game cards around the edge of the other circle, in such a  
that they will show through the window of the first circle. When they are pinned  
ther, rotate the top circle as you describe the food cycle to the students.

Students find pictures of animals to make into food cycles, with the decomposer card to Activity 4-18  
lete the cycle.

Students collect trash from the wastebaskets in a classroom other than their own. Weigh Activity 4-21  
is collected.

One or more bags of classroom trash and have students sort trash into categories such Activity 4-21  
aper, glass, plastic, metal, food. These categories could be weighed and grouped into  
egradable and nonbiodegradable materials.

Take the trash from the lunch room after one lunch period or one day. Speculate about the Activity 4-21  
over a period of weeks or months.

Photograph and/or display the bags of trash that have been collected. If possible, photograph Activity 4-21  
total school trash for one day.



## Me and my Environment

### UNIT IV TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT CHANGE OF PACERS

Spring scale  
Plastic bags to use as gloves

Booklet, *The Processing and Recovery of Jon Thomas -- Cool Cat*,  
1 Copy per student  
Opaque projector

Camera and film

27. If students' interest in garbage warrants it, have student and weigh each category with the spring scale to find which come either from your home or from the students' homes.
28. Obtain copies of *The Processing and Recovery of Jon Thomas* some bookstores and can also be purchased from the Superintendent of Government Printing Office, Washington, D. C. 20402. Prior to the booklet is one that can be enjoyed by adult and child the understanding of poor readers. Using an opaque projector the class. Have several copies so students can follow the
29. Use a camera to make a pictorial essay of the daily activities
30. Have students photograph the art objects they have created
31. Exhibit the students' art work in an appropriate place in school showcase. Actively involve students in planning an exhibit.

## UNIT IV

### TRANSFER AND CYCLING OF MATERIALS IN MY ENVIRONMENT CHANGE OF PACERS



BSCS

' interest in garbage warrants it, have students sort real garbage into categories, Activity 4-22  
each category with the spring scale to find which is heaviest. The garbage could  
from your home or from the students' homes.

es of *The Processing and Recovery of Jon Thomas -- Cool Cat*. This is available in Activity 4-23  
ores and can also be purchased from the Superintendent of Documents, U. S.  
Printing Office, Washington, D. C. 20402. Price \$0.55, Stock Number 5502-0084.  
is one that can be enjoyed by adult and child alike, and has cartoons to help  
standing of poor readers. Using an opaque projector, read and discuss the story with  
Have several copies so students can follow the story.

a to make a pictorial essay of the daily activities at the local dump. Activity 4-23

ts photograph the art objects they have created. Activity 4-26

students' art work in an appropriate place in the school, such as the Activity 4-26  
case. Actively involve students in planning and setting up the